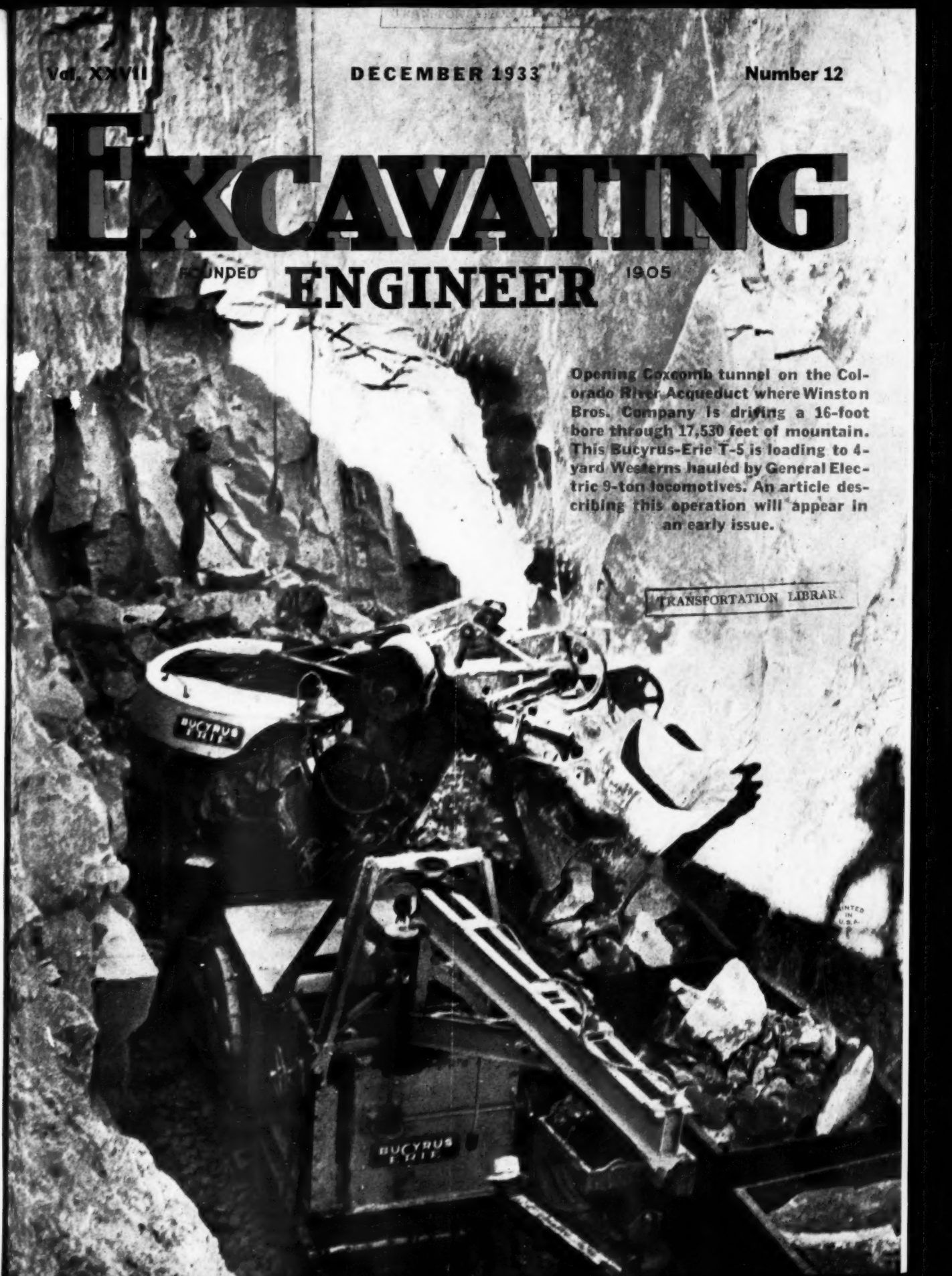
Vol. XXVII DECEMBER 1933 Number 12

EXCAVATING ENGINEER

FOUNDED 1905



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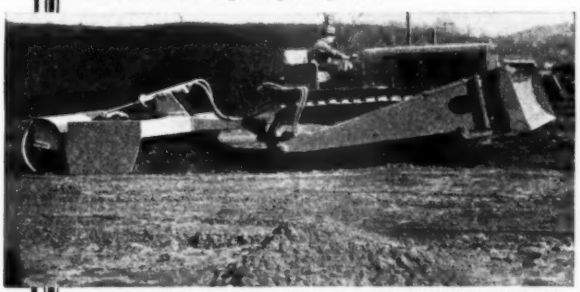

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PUBLISHED MONTHLY BY
The Excavating Engineer Publishing Co.
SOUTH MILWAUKEE, WISCONSIN, U. S. A.

F. O. WYSE, *Managing Editor* ARNOLD ANDREWS, *Editor* E. M. HEUSTON, *Advertising Manager*

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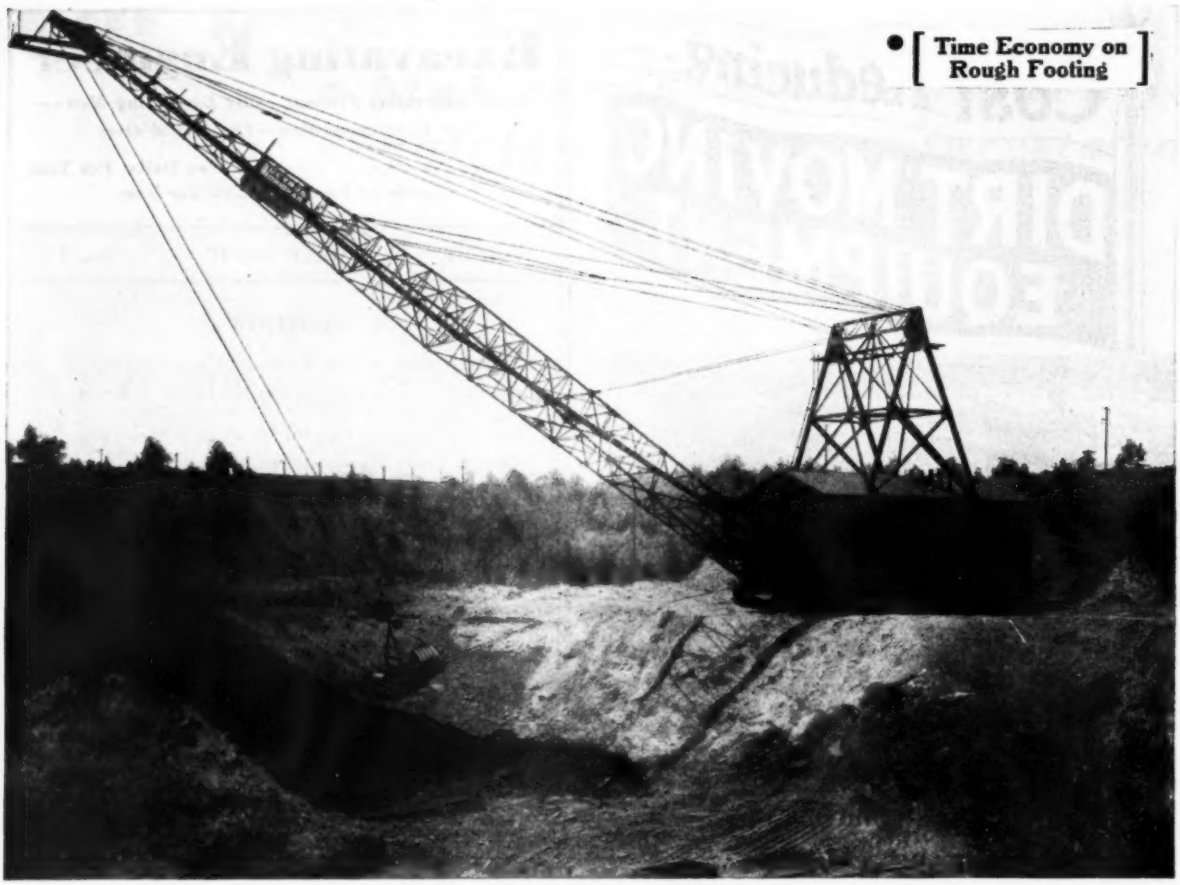

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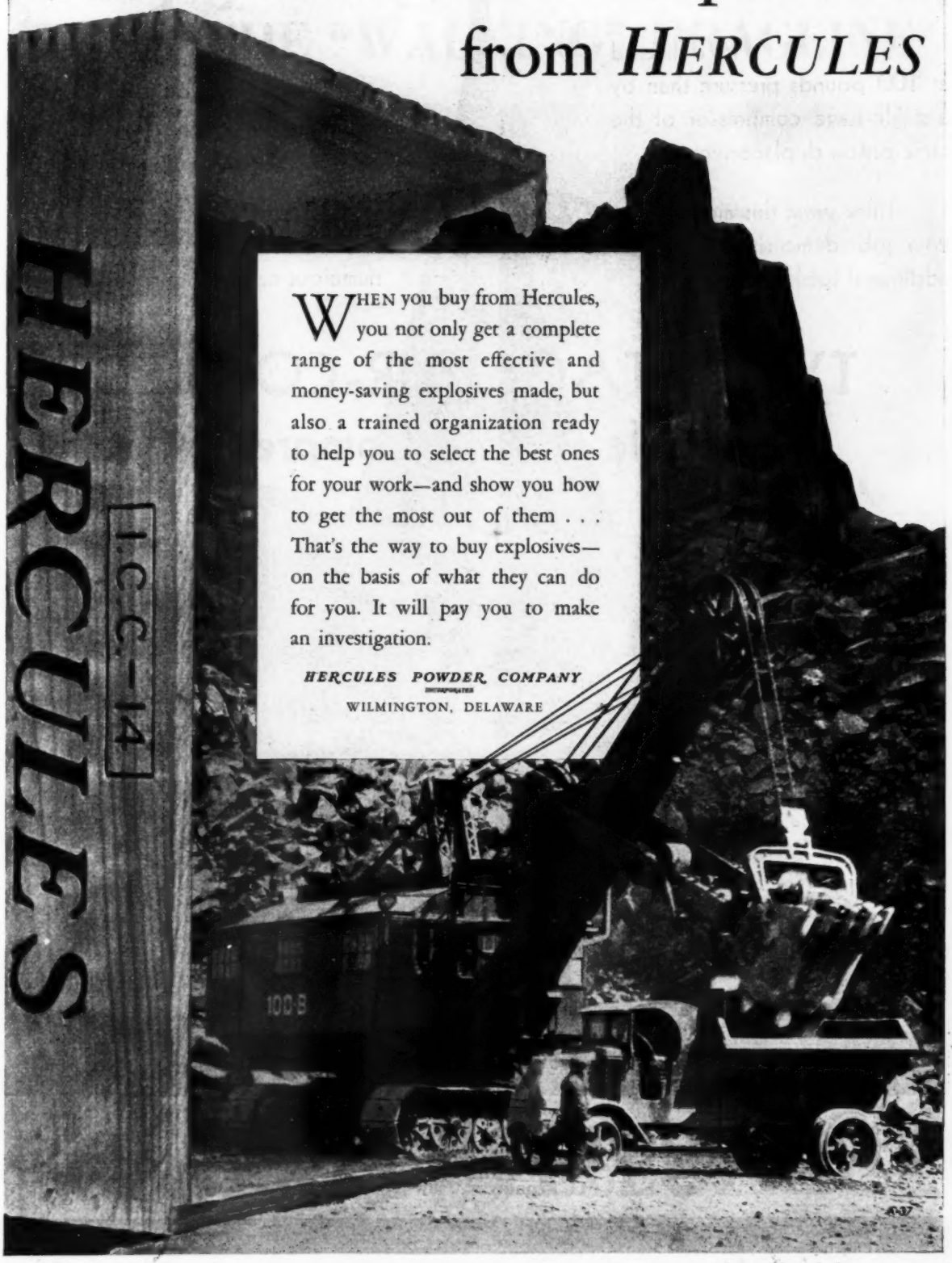

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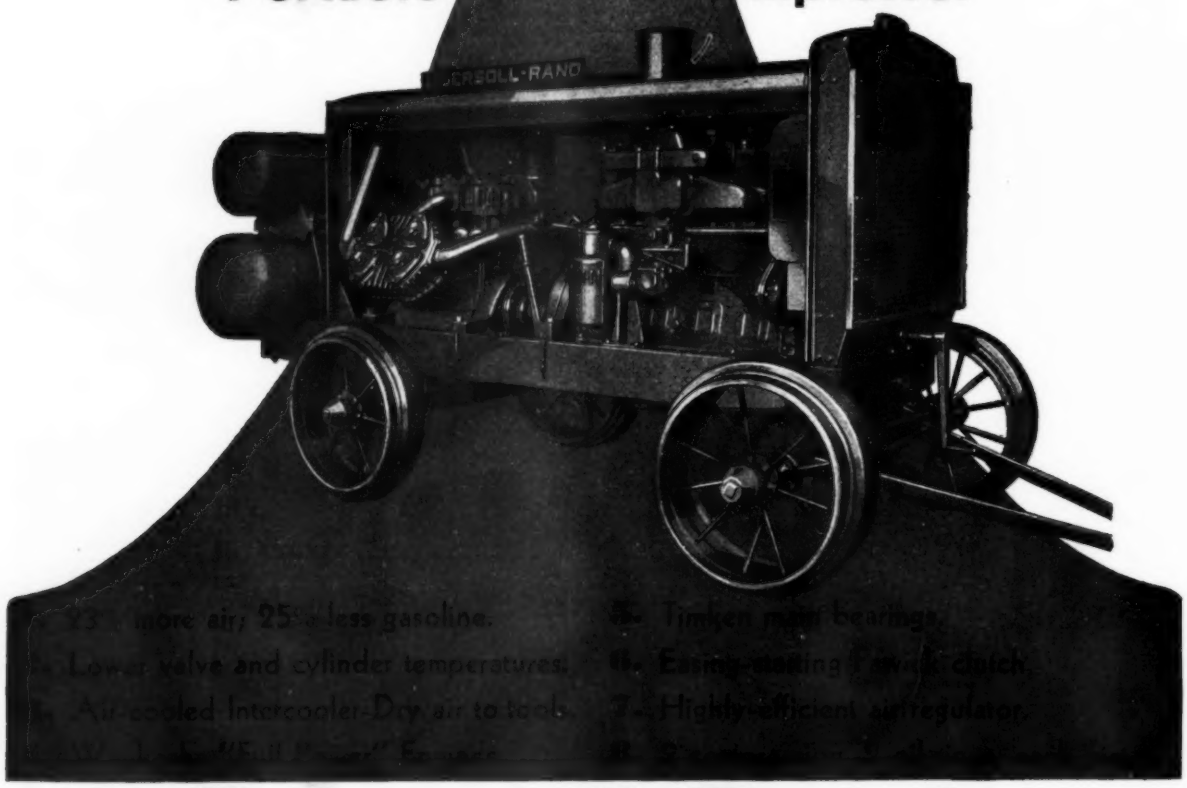

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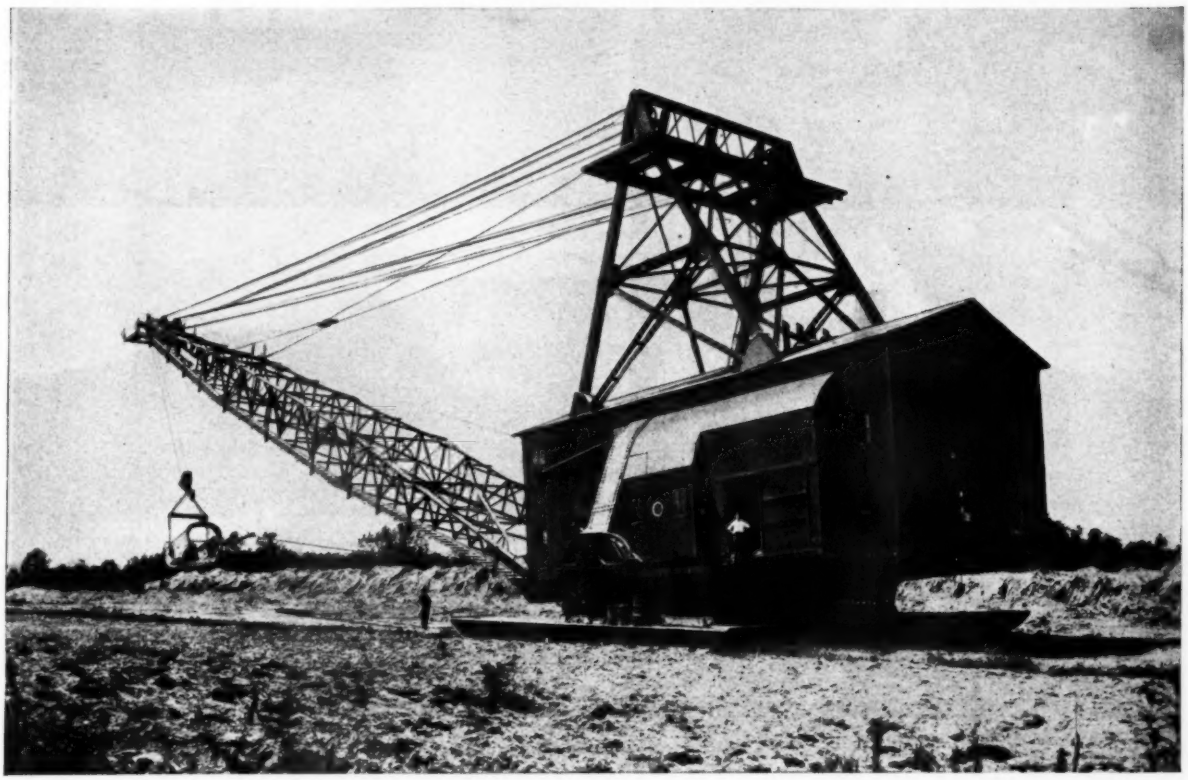

ON soft, swampy footing, the G-E equipped "walking" dragline steps ahead, accomplishing its task with noteworthy economy and surefooted dependability. It exemplifies the high standards of performance which G-E engineers, in coöperation with the manufacturer, help to attain. For, governing its pace, and supplying its power, are G-E motors and control. On them, every motion of the big machine depends.

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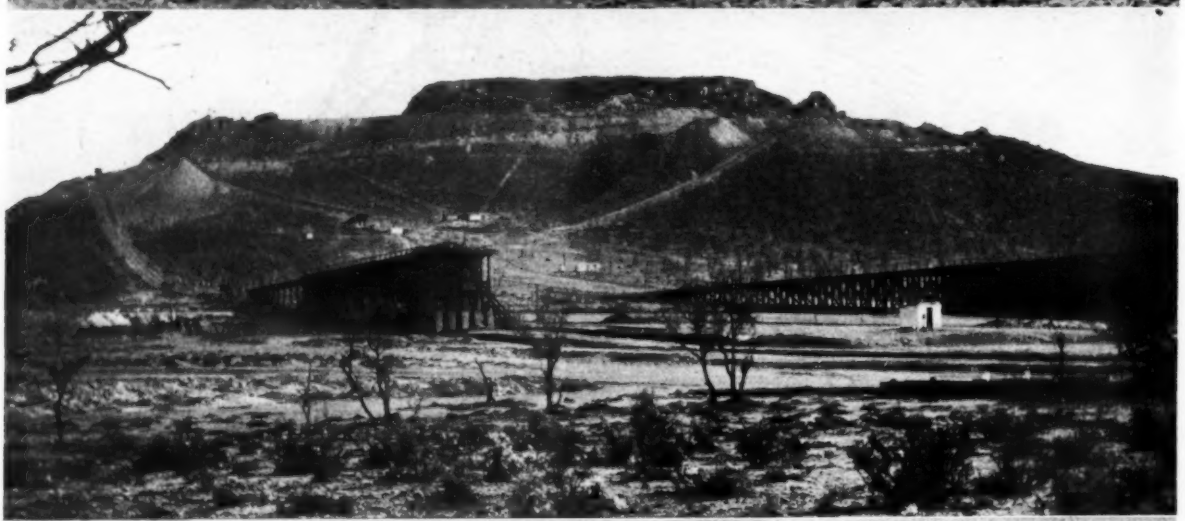

Above—Hauling equipment in Quarry "E," Iron Monarch. Center—Iron Monarch benches, showing inclines, bins and viaducts. Below—Bucyrus-Erie electric shovels at work in Quarry "E," Iron Monarch. General Superintendent Hockey comments: "Each of the two 120-B shovels installed at Iron Knob has now handled approximately two and a half million long tons of extremely hard, heavy iron ore under very severe digging conditions. They have been kept maintained in 100 per cent condition, and are, like John Walker Whiskey, still going strong."

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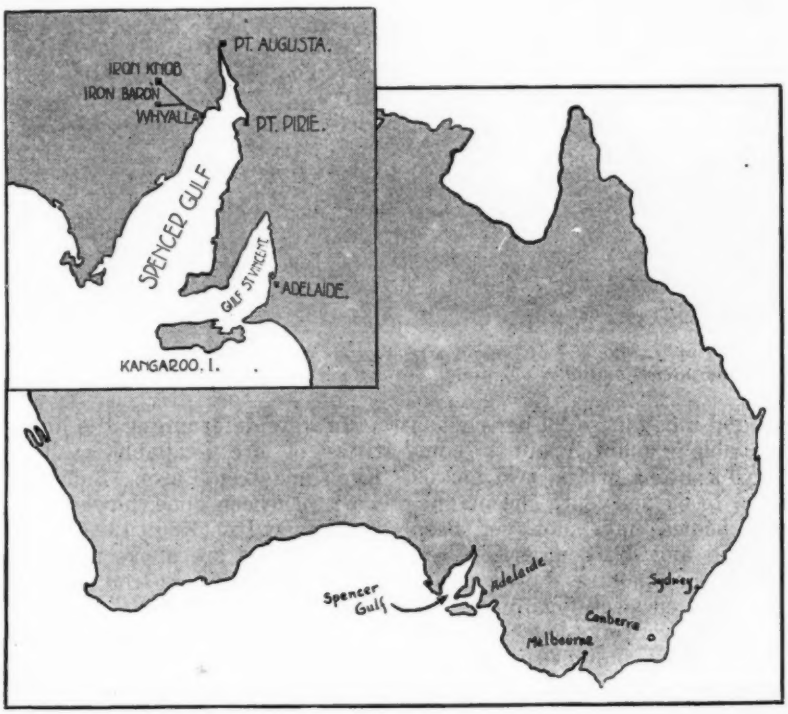


Mining Ironstone at Iron Knob, South Australia

Mining Ironstone at Iron Knob, Broken Hill Proprietary Company Works Rich Deposits with Modern 4-Yard Electric Shovels

By F. R. Hockey, General Superintendent of Quarries

ALTHOUGH known for many years, no particular interest was taken in Iron Knob until, in the early nineties, a prospecting syndicate pegged out a portion of the ore-deposits in an unsuccessful search for gold. The leases were acquired by the Broken Hill Proprietary Company in 1899 as a source of iron ore for fluxing purposes in its lead-smelting process at Port Pirie. A year later, the company under the charter of a private Act of Parliament, began the construction of the Iron Knob tramway and ore-loading jetty at Whyalla. A few hundred tons of ironstone weekly comprised the demand in those days, and it was not until the approaching inception of the company's steel venture at Newcastle, New South Wales in 1913, that preparations were made to reconstruct the tramway for heavy ore traffic and to extend the jetty for the mechanical loading of steamers. The first shipments of Iron Knob ore from Whyalla were dispatched for the Newcastle steelworks in 1915. This date marked the commencement of a period of ever-increasing production, until today more than a million tons of ore per annum are shipped from this port.

Situated in the county of Manchester, in Northern Eyre's Peninsula, the Iron Knob ore-deposits form the basis of the industry. This mine is connected to the port of Whyalla by the reconstructed tramway 33½ miles in length while another tramway has been constructed to link up the same port to a second group of iron ore leases known as Iron Baron, 18 miles south of Iron Knob. Iron Monarch, the major hill at Iron Knob, rises 1150 feet above the sea level; while Iron Baron and another hill, Iron Prince, also attain a similar height. This brings these three hills to an elevation of from 600 to 700 feet above the surrounding rolling plains.

Iron runs from 64 to 69 percent.

Hematite, magnetite, and limonite are all present in these formations, but the hematite predominates strongly, and ranges from the remarkably pure Iron Knob ore containing 69 per cent of metallic iron (chemically pure hematite contains 70 per cent iron) to the high-manganiferous iron ores of a portion of the Iron Monarch with a manganese content in some cases exceeding 30 per cent. Practically any grade of hematite between manganese

Cleaning up . . . the size of these 4-yard electrics can be appreciated by comparing with the pitman and oiler alongside. See editor's note at the bottom of this page.

nil and manganese 20 per cent is available in quantity, but the combined content of the two metals is 66 to 69 per cent. The magnetite bodies have not yet been worked and, by comparison, are small; the limonites, however, are encountered occasionally in the hematite workings and, owing to their higher combined water-content, have the effect of lowering from time to time the iron tenor of the bulk ores produced. It is exceptional, however, for the metal to fall below 64 per cent.

The principal demand is for hematite of low manganiferous content, and for this reason the company has undertaken the development of its Iron Baron leases, which, so far as is ascertainable today, contains only this class of ore.

Only a portion of the deposit proven

Beyond surface surveying and a certain amount of diamond drilling, no great expenditure has been incurred in the direction of accurately determining the quantities of ore available at Iron Knob and Iron Baron. Sufficient work has been done, however, to indicate at Iron Knob 130,000,000 tons of good ore above the level of the plain, and at Iron Baron a conservative estimate indicates some 100,000,000 tons. With such adequate supplies assured, the need for any very extensive drilling or other exploratory work will not arise for a great many years. It may be mentioned here that already 9,000,000 long tons of high grade ore have been mined and dispatched from Iron Knob, principally from the Iron Monarch ore-body.

Modern Equipment Speeds up operations

From the inception of operations in 1900 until 1917 hand winning methods were solely employed. At the latter date steam shovels were introduced, and during 1928 a complete change-over to electrical operation of all equipment was effected. As, at the present time, almost the entire output of iron ore is won from the Iron Monarch, a description of the methods and equipment there employed will be given.

The Monarch rises as a round dome 640 feet above the plain and has a base diameter of 1½ miles, and an early step in its development was a surveying and sampling campaign, by which the whole hill was subdivided into 100 foot squares. In each of these squares samples were taken from outcrops, pot holes and costeens, furnishing data for co-ordinated sample-maps and contour-plans. Benches were then established, as shown diagrammatically in Fig. 1, where the full and dotted

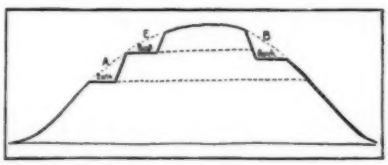


Fig. 1

line shows the original profile of the hill (exaggerated as to height) and A, B, and E the different benches in their order of development.

In recent months E bench has extended into and supersedes B. This E bench, or quarry E as it is locally known, is the principal

Quarry "A" as arranged for manual loading; Iron Monarch.

EDITOR'S NOTE: Our readers will no doubt be interested in the peculiar "coop" installed on the roofs of the 120-B shovels. Perhaps a word of explanation is in order. After the shovels had been put to work the Broken Hill Proprietary Company, because of local power and line conditions, decided to install starting compensators for the main motor generator sets. During the starting of the M.G. sets the compensator limits the voltage variation at the shovel and consequently the variation for the entire mine thereby obtaining more satisfactory operating conditions for the plant at the end of the long transmission line. As a matter of convenience individual compensators were used on each shovel and were mounted on I-beams above the machinery and enclosed above the roof of the shovel as shown. Where similar power conditions are known to exist compensator equipment is ordinarily installed by the manufacturer along with the other electrical machinery. However, the unique installation used here on top of the shovels serves the purpose satisfactorily to the owners.

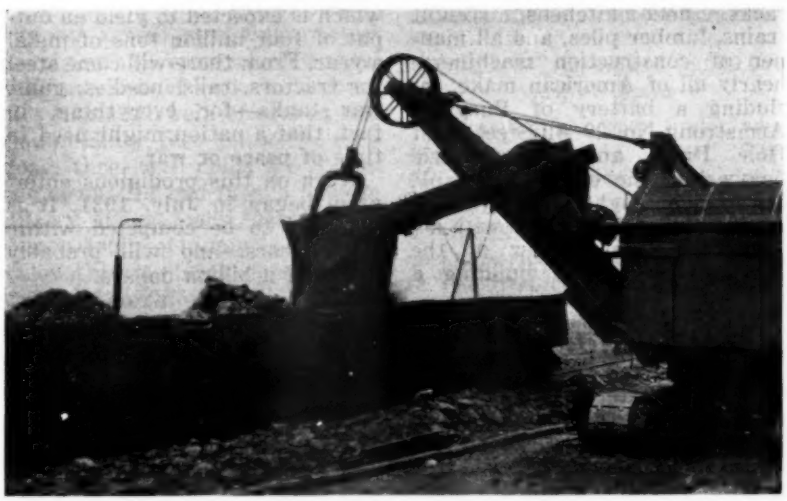
working, and has reached now an effective length of 3,400 feet, with a mean height of 110 feet, and 90 per cent or more of the face is iron ore. Before exhaustion of this bench, i.e., before the top slice of the hill is removed, a maximum height of face of 150 feet will be worked, and 13,000,000 tons of ore will have been won. Between E bench and A bench there is estimated 27,000,000 tons and two subsequent benches are estimated to yield 40,000,000 and 50,000,000 tons respectively.

Arrangement of traction conductors, Quarry "E;" Iron Monarch.

The first step in breaking ore from the face is the drilling of the ground for blasting purposes, and the general mode of placing the drill holes is as shown in Fig. 2. All the face holes are 20-22 feet deep, and are "bulled" or chambered to permit the placing of adequate charges of explosives, ranging from 200 to 400 pounds per hole.

Air Drills used for Blast Holes

Gardner-Denver "Clipper" drills of the high-speed, hand-held, air-hammer type are employed, working at 100 pounds per square inch air-pressure, with one-inch, hexagon, hollow steel with standard 4-point bits. Sharpening of the steel is effected with Ingersoll-Rand Leyner machines, and a Morgan Hot Miller. From 1000 to 2000 drills per shift are handled in the drill shop in addition to the cutting, bitting and sharpening of new steels. A 2-ton motor lorry (truck) is used to transport steel from the shop to the various parts of the working face, and has been found more economical than any other means of transport. Pitching drills have 2¾-inch bits, reducing to 1-9/16 inch for the finishing steel of a 20-foot hole. Air is furnished by an electrically driven Australian-made Compressor of 1200 cubic feet per minute free-air capacity.



These 30-ton cars were designed by the author of this article being modified from cars used at Kiirunavaara by T. G. O. (see July, 1929 Excavating Engineer.)

Explosives used consist of 75 per cent blasting gelatine for chambering and 25 per cent ligdyn for primary blasting. For secondary blasting, of which little is now done, 50 per cent gelignite is used. All holes are electrically fired with current from the quarry blasting mains energized at 100 volts. There is no practical limit to the number of holes that may be fired simultaneously, but, in actual operation, it is found that blasts of 10,000 tons or less are most suited to the local requirements of ore-grading, and the heavy blasts, used elsewhere in Australia, and which are so popular in America, offer no specific advantages at Iron Knob. Fig. 2 shows the result of a blast with a heavy bank of broken ore lying against the fresh quarry face. Immediately after blasting, drilling is resumed at the top of the face and, as the quarry plant removes the broken ore, the middle and lower row of holes are again drilled for the next blast.

The rill or ore bank consists of material varying in size from fine sand to lumps of 10 or 20 long tons weight, and, in the case of faulty ground, lumps running into hundreds of tons weight come down and require secondary blasting before the shovels can deal with them.

(Continued on page 525)

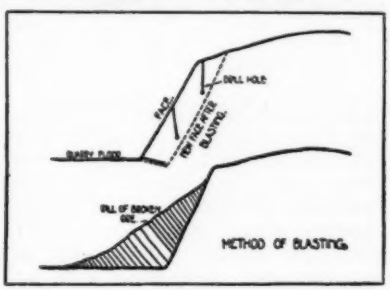
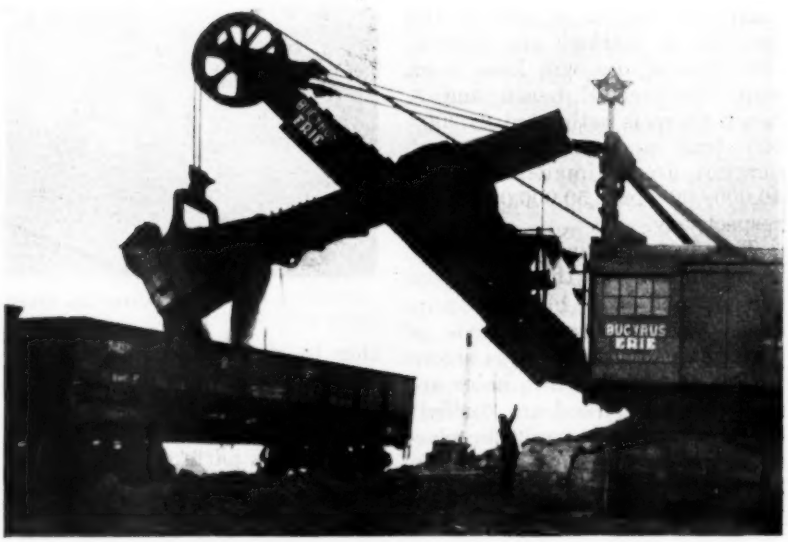


Fig. 2

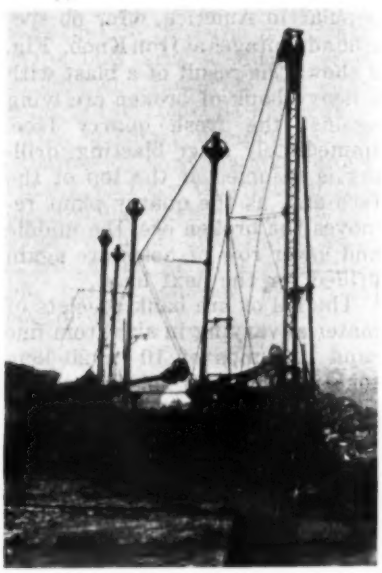
Helping to Develop Immense Iron Ore Deposit in Russia



One of the big 4-yard electric shovels that loads the ore from Magnet Mountain. Note the red star of Russia mounted on the A-frame.

IN THE URAL MOUNTAINS, Russia's great natural and impregnable fortress—dividing Europe from Asia, a region immensely rich in minerals, the U.S.S.R. (Soviet Russian) Government has undertaken as part of its Five-Year Plan the most ambitious industrial expansion program in modern history.

In the very heart of this territory is Magnet Mountain. Three miles long, two miles wide, and one thousand feet high, it is nature's grandest gift to Russia —a gift for which a country like Japan would gladly pay billions—for it is one solid mass of iron ore, the purest in the world. For ages this mountain lay untouched. All around was steppe country, gray, barren never-ending, and dotted with bands of nomads and straggling villages.



Bucyrus-Armstrong 29 drills at Magnitogorsk

Now it is the scene of the biggest construction camp in the world, with endless rows of tents, barracks, field kitchens, freight trains, lumber piles, and all manner of construction machinery, nearly all of American make, including a battery of Bucyrus-Armstrong No. 29 All Steel Blast Hole Drills and Bucyrus-Erie heavy duty shovels.

Day and night, Sundays and Holidays, the place roars with activity. In the shadow of the mountain Russia is building a new city, Magnitogorsk, and also the most ambitious project she has yet undertaken—a steel plant which is expected to yield an output of four million tons of metal a year. From there will come steel for tractors, rails, needles, guns, war tanks—for everything, in fact, that a nation might need in time of peace or war.

Work on this prodigious enterprise began in July, 1931. It is expected to be competed within three years, and will probably cost half a billion dollars.

Road Builders Meet at Chicago Jan. 22nd

THE annual Convention and Exhibit of the American Road Builders' Association, which will be held in Chicago during the week of January 22nd, with headquarters at the Stevens Hotel.

A committee is preparing a program that will be of special interest to those within the industry and one that will be of great assistance in solving the problems that are now confronting the highway program. Men in strategic positions will take part in the program and their contributions will be of valuable assistance toward the continuation of an adequate program and its methods of financing.

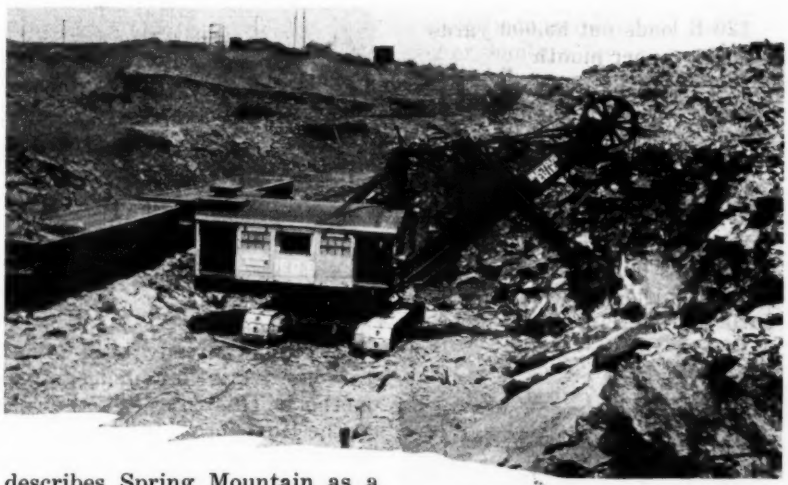
A warning has been sounded. The highway program hangs in the balance. The highway forces of the country will rally to the cause. It is hoped that the Convention will lead the way in solving the problems confronting the industry. A most interesting and valuable program is promised.

Reduced railroad fares will be in force. Hotel rates have been reduced.

SPRING MOUNTAIN—
the Steam Shovel Graveyard

Old equipment is relentlessly discarded by Dick Construction Company, of Hazelton, Pennsylvania, as modern tools show bigger outputs and lower costs on anthracite stripping.

By **D. W. EVANS**



They buried the old-fashioned railroad-type shovel it replaced. This 120-B Bucyrus-Erie in the east pit at Spring Mountain loads to 30-yard Westerns. 3-years old, it is still the last word in modern efficiency. Two shifts are worked, Bill Thomas handling the morning hours and Harry Filbert the afternoon.

NEAR the Audenried station, the Lehigh Valley railroad passes along a narrow embankment between two deep pits. In the pit to the east the Dick Construction Company is carrying on a coal stripping project involving the removal of several million yards of rock, to uncover the Mammoth vein of coal at this point. Sixty feet below the railroad, three well drills are churning away. Beyond them a modern quarry shovel loads blasted rock into a train of dump cars. Just below the long black slope of rock to the north, another electric shovel loads out the fine anthracite coal. Further to the east is the pit left by a previous stripping, into which rock from the present job is hauled and dumped.

Dick Construction Company is managed by A. E. Dick and James A. Sechler. A. E. Dick also directs A. E. Dick Contracting Company which is handling the Honeybrook job described in Excavating Engineer for September, 1933. Spring Mountain is about a mile from the Honeybrook pit, and is just on the outskirts of Audenried, Pa. While Honeybrook is unusual in its size, continuity and methods, Mr. Dick describes Spring Mountain as a typical anthracite stripping. The two projects are alike in much of the equipment used. But the striking point of similarity is that impression of Dick efficiency, of rapid removal of rock at a rate as constant as a factory schedule.

"Standards" complete 6,000,000 yard stripping

Stripping has been under way here continuously since 1920. More than seven million yards of dirt and rock have been removed at Spring Mountain, and that means strict attention to business.

The first contract involved 6,000,000 yards, the rock being dug by two Bucyrus railroad shovels, a 70-C and an 85-C, both mounted on caterpillars. This pit was completed in 1931, although it will be noted by referring to the two sketches that scarcely a third of the total width of the basin has been cleaned up. Then during a short five months' job in 1926 the outcrop at the north edge of the present operation was uncovered down to a thickness of 10 feet. The present job was begun in March, 1930. On this stripping a total of 3½ million yards of rock will be hauled from the pit, and 900,000 tons of anthracite loaded out to market.

By referring to the cross section sketch, we see that the basin of coal at Spring Mountain is shallower than it is at Honeybrook. The Mammoth Vein at the bottom of the basin is 35 feet thick, and slopes upward toward the outcrops at an angle of 22°. Maximum depth of overburden is 100 ft. and all but 20 ft. or so of this is rock consisting of some granite, mostly conglomerate shale and sandstone. The plan view indicates the layout of the present job, and shows the relative location of the various stripping operations.

Modern equipment on present job

The two Bucyrus railroad shovels which finished the contract east of the present one were still in A-1 working order. But the Dick organization which has pioneered new stripping methods and introduced new stripping equipment for two or three generations had already proved to

themselves the superiority of the modern close-coupled full-revolving quarry shovel. A new 4-yard Bucyrus-Erie 120-B Ward Leonard electric shovel was set up on the job. A few months later a 2-yard Bucyrus-Erie electric shovel was imported to load out the coal.

120-B loads out 60,000 yards per month

The 120-B had first to take off 20 to 30 ft. of cemented gravel which lay just beneath ground level. This was taken off in one lift. According to Gus Meyers, the Superintendent on this job, outputs in this easy digging ran as high as 60,000 yards a month (single shift). So it wasn't long until the big shovel was down to

Pulling out a big one.

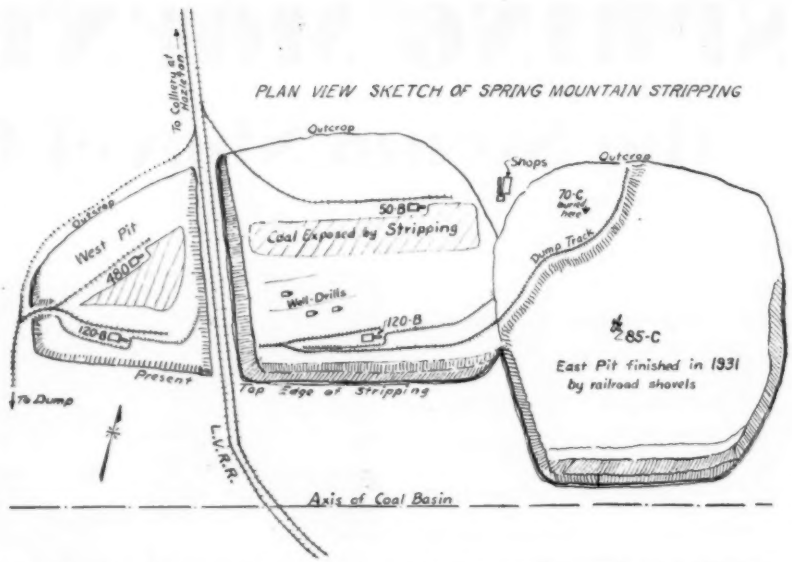
rock, and drilling and shooting were started.

The primary drilling is handled by two Loomis "Clipper" 6" blast hole drills, electrically driven, and a gasoline powered 6" Sanderson "Cyclone" now eight years old. This old timer costs more to operate than the electric drills, but a gasoline machine is indispensable for proving work on new stripping operations exploration.

Previous mining makes drilling Difficult

Practically all of the coal in the "Middle Field" of the anthracite district has already been mined to some extent by underground methods. This is true of the coal at the Honeybrook pit already referred to, and also of the Spring Mountain stripping job. In all underground coal mining, both anthracite and bituminous, first mining involves the driving of "chambers" through the coal, each chamber being separated from the next by a "pillar" of coal twice as wide as the chamber. Specifically, at the Spring Mountain job these chambers were driven from the thickest part of the vein toward the outcrop. Each chamber is from 8 to 10 ft. wide, and coal was removed for the entire height of the vein. This first mining left the pillars, blocks of coal 16 to 20 ft. wide, and also the height of the vein. The usual practice in underground mining is to complete the first mining and then, working from the remote edges of the property, start secondary mining or "robbing". This means removing the pillars of coal, and removal of the pillars results in collapse of the overlying strata. This work is more dangerous than first, or chamber mining, and is also more expensive. Due to the constant progress toward greater economy in stripping equipment and methods, it is often far cheaper to remove the pillar coal by stripping than by underground mining.

In many instances such as on the Spring Mountain job the overlying strata of rock cave in, filling the chambers between pillars. In other cases, where the roof of rock has remained firm, the drills will churn down through the rock into the empty space below. This makes it impossible to spring the holes, and is just one more reason that shooting is such a problem on anthracite stripping. Sometimes, too, when a blast hole drill has put a hole down, in springing, a cave will occur, so instead of a 6" hole with a chamber at the bottom to be loaded with dynamite, all you have left is a hole 3 or 4 feet in diameter that is a menace to the workmen. All such



The dump is a shovel graveyard. Below the train a 70-C is buried—the 85-C in the foreground will suffer a like fate as soon as the fill gets that far. These two old shovels, built by the Bucyrus-Erie organization, helped to dig 6,000,000 yards out of the hole which becomes their grave.

Phil Diehl has to be an artist with this 50-B — the coal was "first mined" long ago, and rock and clay fill the space between the pillars of coal. The Vulcan duplex has a coal car on front, and a 30-yard Western air dump for dirt on behind. It's up to Phil to decide which car the dipperful goes in.

worries are old stuff to Mike Mastrulla, the pit foreman, and in spite of them the rock is shot up well enough for the 120-B shovel.

Another pit opened

This pit is bounded on the west by a branch of the Lehigh Valley Railroad, and when the present contract had been under way for a year and a half it was decided to open another pit just west of the railroad. The Dick Construction Company purchased another Bucyrus-Erie 120-B for this second pit, using a 1½ yd. Osgood steamer for coal loading under the supervision of Donald B. Dick. While both pits are parts of the Spring Mountain job they are, to all intents, separate jobs, although worked by identical methods and almost identical equipment.

Use quarry shovel for loading coal

These two 120-B's are both worked against a 12 to 15 ft. bank of rock. The actual working time varies. At the time of our visit the newer shovel was working one eight-hour shift per day. The other machine operated two eight-hour shifts, and while in the rock most of the time, would load out a couple of thousand tons of coal at such times as the 50-B couldn't supply the demands of the coal company. William Thomas runs the 120-B on the morning shift, and Harry Filbert handles the afternoon shift. The newer quarry shovel in the west pit is operated by John Brennen. All three men are capable of loading out the average "35,000 yards of rock per shift per month" that is a sort of slogan on every stripping job run by Mr. Dick.

Hauling equipment revolutionized

Every phase of anthracite stripping is watched constantly by these contractors. Many an improvement in efficiency has resulted from this study. They had determined that a reduction in costs could be obtained here by the use of larger hauling units. The reduction is due to faster hauling accomplished by the use of a few large cars. With these, less spotting at the shovel is required, increasing shovel output, and fewer trains per hour are hauled from the pit, but each one carries a larger load.

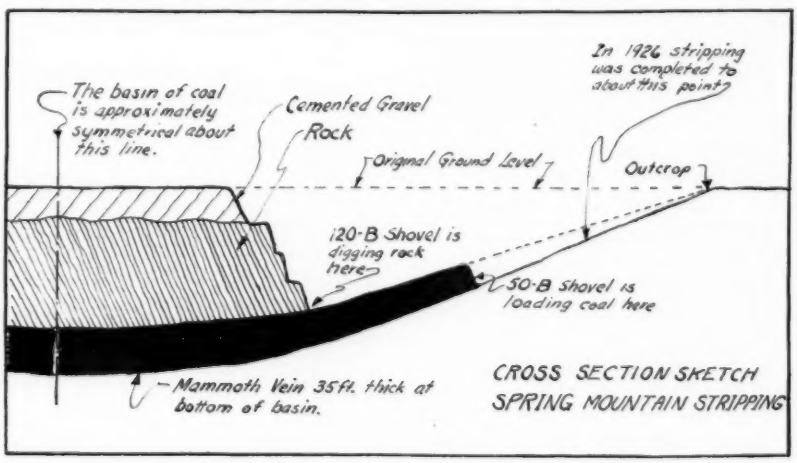
For hauling the cars, a brand new type and size of locomotive was purchased. This was a 50-ton 13x16 Vulcan duplex with four drivers under the engine and four under the tender. This engine has plenty of tractive effort to haul two 30-yard cars of rock out of the pit. The second train was, for a time, hauled by a 42-ton Shay-geared Heisler.

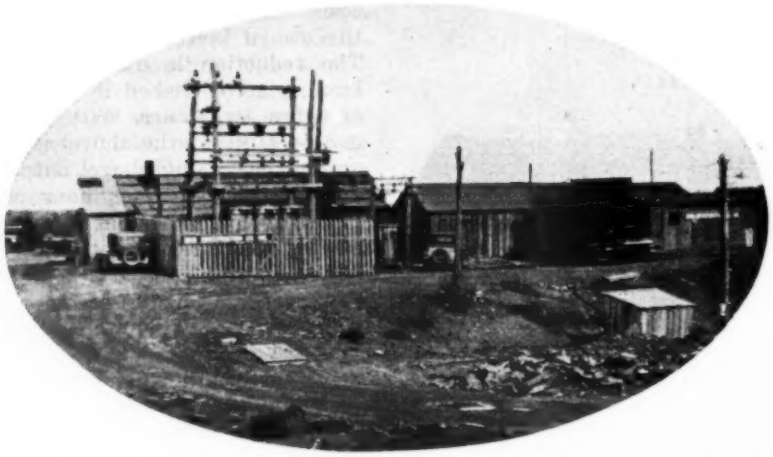
Roy Blackwell, who used to be a State Trooper, runs the "original" Vulcan duplex engine.

The 30-yard Western air dump cars into which the rock at Spring Mountain is loaded are another new feature in anthracite stripping. They are the largest dump cars ever used on this type of work. Their capacity and rugged construction have proved perfectly suited to large yardage output in rock.

In order that the big cars and heavy locomotives may operate under the best possible conditions, the necessary stability is provided by standard gauge track. This is the first use of such width of track on a contract of anthracite stripping.

Having taken out three lifts, the big quarry shovels are down 60 ft. now. Rock is loaded into the 30-yard Westerns and hauled


In 1926 stripping was completed to about this point
The basin of coal is approximately symmetrical about this line.
Cemented Gravel
Rock
Original Ground Level
Outcrop
120-B Shovel is digging rock here
50-B Shovel is loading coal here
Mammoth Vein 35 ft. thick at bottom of basin.
CROSS SECTION SKETCH
SPRING MOUNTAIN STRIPPING



The shops at the Spring Mountain strippings. In the blacksmith shop at the left, drill steel for both jackhammer drills and tripod drills is sharpened. The well drill bits are dressed here too.

away at the rate of 3 trains an hour. It's some haul, too. The 50-ton Vulcan pulls the loaded cars up a stiff grade to the switch back, this grade running 8% for 100 ft. of the distance. Every ounce of steam is needed, and sometimes they have to get a running start to get over the hump. From the switch back a fairly uniform 3% grade runs up the south bank of the pit to the dump, a distance of 700 yards. One curve is a bit sharp, and almost stalls the engine.

The graveyard

The dump at this job is a shovel graveyard, and shows strikingly the progress of shovel building since the introduction of modern full-revolving quarry shovels, such as the 4-yard Bucyrus-Erie 120-B's used by the Dick organization. The rock dug by these shovels is being dumped into the older stripping which was finished by the two railroad type shovels. Modern quarry shovels made these "standards" a drug on the market. A junkman wouldn't even take them as a gift. So they were just left in the pit. The 70-C has already been buried under thousands of yards of rock dug by the 120-B, and as soon as the fill gets there the 85-C will be buried too. Superintendent Gus Meyers says the funny part of it is that after they buried the 70-C, a man came to buy the caterpillars on it, and they told him just to help himself—if he could. It was too late to dig the machine out again.

Coal sorting with shovel

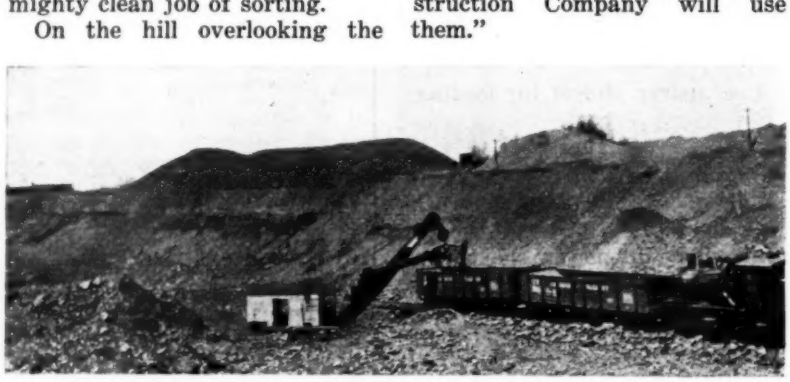
The coal at Spring Mountain is owned by the Lehigh Valley Coal Company, who furnish standard gondolas into which Phil Diehl at the levers of the 50-B, loads coal. His job is not nearly so simple as that, however, as he has to do considerable sorting with the dipper. When the going is good, two 50-ton capacity gondolas are backed down for loading. But usually the Vulcan duplex has a gondola at one end and a 30-yard Western at the other. Phil Diehl will load half a dozen dippers of coal into the gondola, and then blow the whistle. The train shuttles back, and he loads a few dippers of rock and clay into the dump car. Another blast, another move, and more coal is deposited in the gondola. He works surprisingly fast, and does a mighty clean job of sorting.

On the hill overlooking the "graveyard" are the modern "shops" for servicing equipment used at Spring Mountain. Two electrically driven Ingersoll-Rand compressors, a 300 ft. and a 1200 ft. furnish air for jackhammers in the pit, and for an IR drill sharpener and an oil-fired forge which are part of the blacksmith's equipment. Behind these shops, on an old dump track, stands a long row of 4-yard dump

Another view of the 120-B showing the standard gauge track to the dump. In the background, the 50-B which loads the coal.

cars, abandoned because they can't meet the lowered costs attained by larger, newer haulage units.

Modern equipment at work, bailing out millions of tons of rock . . . older stuff in the discard, acquiring rust or being buried! To paraphrase a famous auto slogan, it seems as though these progressive contractors say: "When better tools for anthracite stripping are built, Dick Construction Company will use them."



The Bucyrus-Erie 50-B loading coal into regular gondola cars for the Lehigh Valley Coal Company.

400,000,000 yards in proposed Florida Cross-state Canal

Preliminary Surveys Nearing Completion and Application Made for 118 Million Dollar Loan

By D. L. WHITEHURST

AN Atlantic-to-the-Gulf canal deep enough to insure safety to sea-going vessels and wide enough to allow them to pass has been placed a step nearer realization by announcement of the U. S. Board of Engineers that the preliminary survey would in all probabilities be completed before Christmas. The course of the inland waterway will not be definitely established at the present; but it probably will follow the northern tier of Florida counties closely and enter the gulf close to where the coastline turns abruptly westward.

At the last session of the Florida legislature a measure was passed which created a canal commission, empowered to arrange for finances and establish procedure. Action taken by the legislators followed announcement by the Federal government that a sum sufficient to make the preliminary survey had been set aside by the army engineers.

Within the last few months many organizations and associations have been formed to promote the canal.

160 miles through sand and coral

The topography of the highlands that run down the middle of the state are such that army engineers have declared the lock system will have to be used in the central part of the state. Much of the soil over which the waterway will course is of sand and coral formation, engineers have found.

The project, according to present plans, will run about 160 miles long. If a route through South Georgia is followed it will be slightly longer. It will be 250 feet wide and 38 feet deep. Originally a course from a point on the St. John's river near Palatka to a point on the Gulf of Mexico near Tampa was favored, but efforts have been made by association to have it leave the Atlantic at a point to the north and touch the gulf higher up on the coast line.

400 million yards excavation

Government engineers have estimated the canal will require excavation of approximately 400,000,000 cubic yards of earth. The magnitude of the project may be best conceived by comparing it with the Panama canal where it was necessary to move over 200,000,000 cubic yards. There is a vast difference however from an excavating engineer's point of view, from the flinty Panama canal rock and the soft sandy loam of Florida.

According to Major Beverly C. Dunn, attached to the U. S. Engineers in Jacksonville, to complete the project in five years it will be necessary for engineers to use the largest and most efficient type of machinery made—buckets of 18 or 20 cubic yards capacity for instance. A fleet of seven or eight dredge units, suction dredges, drill barges, six or eight sea-going scow barges, three or four tug boats and a couple of unloaders.

An idea of what has been required to get the project to its present stage may be gained in the statement that before all the preliminary work is done 1,500 miles of transit lines will have been run, wash boring of at least 400 holes, testing of more than 1,000 wells along the line to determine water lines and capacity, a geodetic survey system of 50 preliminary survey stations, half that many classified as secondary and scores of level markings for map making, thousands of feet of test drilling to determine rock formations.

Traffic problems by rail, by road and by water have been partly worked out in the governmental survey. It shows that at least 15 bridges would of necessity span the canal in its course across the state. Building a quick lift draw bridge at least 250 feet long for railroads is no small engineering feat. Highway bridges must be of the high suspension type to easily allow the passage of vessels. It will be necessary to have at least two locks.

The exact location of the canal will not be known for several weeks, government officials have said. A number of associations have been working with the state and government agencies in compiling masses of information and data.

118 million dollar loan asked

Conspicuous among those interested in the promotion of the project have been officials of the Engineering Society of Florida, with offices in Gainesville, Walter F. Coachman, secreteary to the National Gulf-Atlantic Ship Canal association, R. G. Patterson of Pensacola, of the Cross-state Canal association, Col. Gilbert A. Youngberg of Jacksonville.

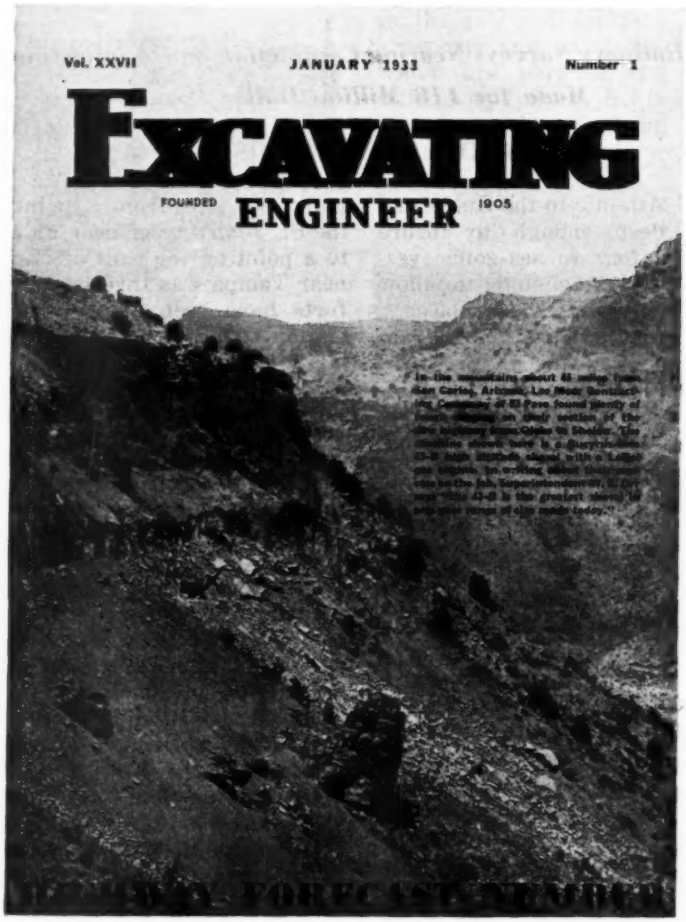
Application for a federal loan of $118,000,000 has already been made by the associations. In making the applications those promoting the project introduced figures to show that the canal would liquidate the debt through toll charges.

The canal will save ships using it nearly 1,000 miles inasmuch as it would eliminate the longer course beyond Key West.

It will require the services of 17,000 men for five years to complete the plan, government engineers have estimated.

Perhaps you've wondered too!

Many readers have asked how Lee Moor Contracting Company managed to get the shovel in on the mountainside cut which was illustrated on our January cover.



SHORTLY after our January issue appeared inquiries started drifting in asking how the blankety blank did Lee Moore Contracting Company get that Bucyrus-Erie 43-B up onto the side of those White Mountains of Arizona where the photograph reproduced on the cover showed her. Various theories were advanced by our inquirers including the possibility that perhaps Bucyrus-Erie had crossed the 43-B with a Rocky Mountain goat.

We wrote Superintendent Orr of the Lee Moor outfit and he gave us the low down which we passed along to those who asked.

Each inquiry we'd figure would be the last one . . . but that January issue seemed to have as many lives as a cat and the old question kept right on bobbing up every week or so . . .

Here's the way Larry Sowles of Six Companies Inc., Engineering Department out at Hoover Dam asked it recently:

"Dear 'Ole Excavator'

"Your magazine which you so kindly are sending to me is read by myself and several fellows about the office here always with interest and many times with profit.

"The cover on your January 1933 issue just stumps me! Hownhell did that guy get a 43-B on that talus slope with no access road? Did he just land it with a couple of 40-ton Sky Hooks, dig himself in, or—maybe there is a tunnel he came out of —or a hidden road? Anyhow I'm all a pant till I get this settled.

"Thanx from an avid reader of your swell magazine

Larry Sowles"

So, for Mr. Sowles and all other readers who have wondered how come, here is the way Superintendent Orr of the Lee Moor Contracting Company, El Paso, Texas, explains the picture:

"The quandary as to how the shovel was moved into place is explained as an optical illusion, due to the position of the cameraman.

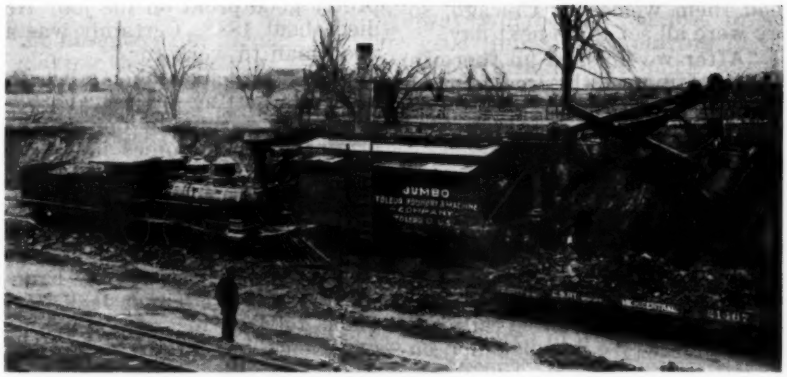
"M. R. Smith of our organization explains that he stood on a projecting point of rock some little distance behind the shovel while taking the picture and, while the cut behind the shovel appears to be closed, it is, in reality, opened to full width of the roadway. The fact that the shovel is digging down on a continuous six percent grade, helps to explain the condition at the extreme left of picture. You will note that the shovel is about to arrive at 'Tierra Firma' just a few stations ahead. The one-half mile just behind the shovel was along a very precipitous bluff section and the shovel was in some precarious places several times.

"I might say that the powerful propelling mechanism, coupled with its flexibility, gave the operators too much confidence in the machine and it required constant vigilance on the part of the writer to see that they did not take too long a chance.

"The 'Sky Hooks' were really needed on several other places on this job, where the distribution was adverse to the general direction of work. However, we finished up the job without a mishap and both machines are ready for something else."

Old Times & Old Timers

Stock's "Jumbo"



OLD TIMER George Williams dropped in at the office the other day to lend us the accompanying pictures and talk about old timers. Having traveled all over the U. S. and also abroad in the shovel game, George is probably well known to many of our readers. At present he's retired on a neat little farm down at Newcastle, Indiana, where he still heaps up the bucket—though now it's with eggs or chicken feed instead of dirt.

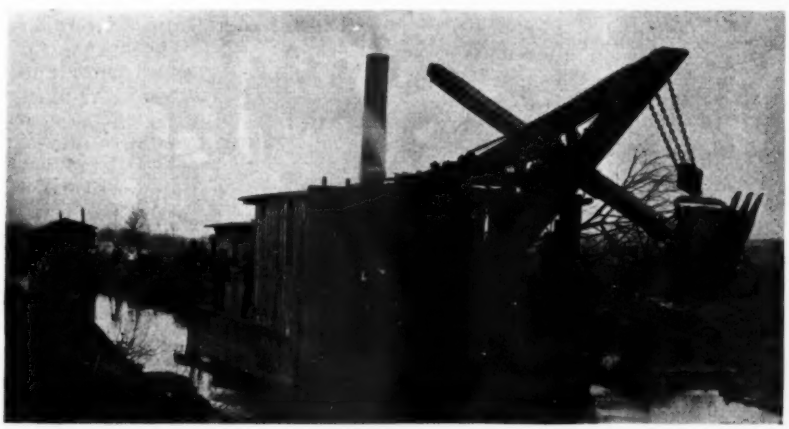
"Did you ever hear," asked Mr. Williams, "of H. T. Stock, the man who built the first standard-gauge railroad shovel back about 1880?"

Being a comparative youngster with only twelve or thirteen years in the excavating game, we were forced to acknowledge our complete ignorance.

"Well, Mr. Stock was one of the real old timers in the game," began George, apparently not at all put out. "I worked for him from about 1879 to 1886 except for one job for another contractor. I operated the 'Jumbo' in the picture for him at the National Exposition of Railway Appliances back in 1883 where we took first prize and gold medal for the best 'excavator and wrecker.'

"Mr. Stock was an inventor, a contractor, and, in addition, a manufacturer. He didn't actually build the machines but had them built on a royalty basis by Vulcan Iron Works at Toledo and later by the Toledo Foundry & Machine Company at Toledo. The Jumbo illustrated sold for about $10,000 and Inventor Stock got about $500 royalty on each machine sold. The machine was standard gauge, had an all-steel underframe, swing engine on the roof, a pair of rotary valve engines for hoisting. The swing engines were 4′ x 10″, two-cylinder with the throttle in the center. A pair of trunk engines on the boom handled the thrust. The Jumbo carried a two-yard bucket in heavy digging and a 2½-yard in sand or light digging.

"Originally operating as H. T. Stock, the firm became Wilcox & Stock later, until about 1884, when Wilcox dropped out. Jim Pembarthy, brother of the Pembarthy who invented the injector of that name, was master mechanic for the outfit. After Toledo Foundry started making the machines they called them Victors, but the machine was pretty much the same as the Jumbos. I think Stock built about 8 or 10 of them altogether under the two names. Before these, about 1880, he put out his original standard, which was a single engine shovel, and 10 or 15 later model railroad-type 1½-yard shovels of the crane type with a pair of rotary valve engines for hoisting, rotary engines on the crane handled the thrust, also there were rotary engines for swinging. He also built a dragline that carried a 1½ or 2-yard bucket and about a 100 or 125-foot boom.*



"After operating in 1883 at the exposition where we certainly had an interested audience, 'Jumbo' was shipped to St. Thomas, then to Dock Siding, about 2½ miles east of Miller's Station on the B. & O. This was about 35 miles east of Chicago in the dune country, and we loaded sand for the South Chicago Dock Company who were filling in dock sites along Calumet River. We used to load 105 standard-gauge flat cars a day regularly. The flats carried an 8-inch rib and a 12-inch drop sideboard.

"We never missed our schedule except one day when my nephew Bill Rollo was operating. The key came out of the throttle lever and the machine set out to tear herself to pieces. Bill piled off pronto and ran as fast as he could around back where he hoped to catch the links and pull the engine up on center.

"I was down along the track and ran for the shovel, but couldn't get there in time. She broke two eccentric rods and that released her. I asked Bill why he didn't stop her.

" 'How could I?' he said. 'She was going too fast. I'd like to see you stop her!'

"But Bill, I asked, what was the matter with the reverse?"

"He didn't say a word, just looked around for a knothole to crawl through. He'd got excited when the throttle pin let go and

*EDITOR'S NOTE: Can anyone tell us more about this machine or furnish a picture of the Stock dragline? Mr. Williams tells us he took it down after it finished a reservoir job at Fort Wayne, Indiana and shipped it to South Chicago about 1879.

forgot that the reverse lever right next to his hand would stop her.

"Well, I took the rods in and had them welded in Chicago, so we were all set to go next day.

"After we finished up there in 1884 we moved this machine to St. Thomas, Ontario, where we built a yard for the Michigan Central.

"The other picture shows a dipper dredge we rigged out of a Little Giant Vulcan on one of Stock's jobs in 1885. We went in at Newcastle, Indiana, to clean some drainage ditches with this machine as a truck-mounted railroad-type shovel. We handled her on 12x12 timbers across the ditch, but after cleaning about three miles of ditch she fell through the timbers and we built a scow and mounted her on that. We were there for two years reclaiming the Blue River bottom lands. Worked 12 hours per day casting out on the banks. This machine as we rigged her on the scow had a walking spud behind and two spuds on the side. Originally we had our living quarters upstairs but when we were digging and the cook was getting a meal that didn't work so good. The pies would bake with all the filling on one side, that is if there was any left in the crust, and the soup would get out of the kettle and try to go for a walk. So we tore off our second story and built the boarding scow you see in the picture. Included in the picture are: Barney McGrady, craner; engineer Bill Rollo (later superintendent for Knickerbocker Ice Co., Chicago); fireman Will Bodette (of the Panama gang later); Ed Bodette (now Harbor Master at Toledo) who hauled our fuel; and deckhand Henry Lutz (later in the real estate business at Edmonton, Alberta, Canada).

"Mr. Stock got 17½ cents per yard on this job and we made a pretty good profit on the job. He died about 1888. Certainly was a good man to work for."

George had just taken a breath and was setting off on another story about running one of the original Otis machines in Toledo back in the 1870's when the phone called him away. But he promises to come back and tell us more stories of the old days when he gets up to Wisconsin again. He loaned us an interesting collection of Stock letterheads and one of them carries an old letter from Jim Pembarthy that we will publish in an early issue.

A Missed Hole that Stood this Old Timer on Her End

WRITING from San Francisco, Old Timer Jack Reganold tells of his most thrilling experience in a lifetime of shovel work that dates back into the 90's.

"I have been reading your articles on Old Times and Old Timers and find them interesting. I have been in the shovel game for sometime myself. I craned and ran shovel on the Mesabi Range in the early 90's and also on the Drainage Canal on section E and G and had a world of experiences but the one I am going to write about is my most thrilling.

"In September, 1907 I was running a Model 60 Marion for Twohy Bros. on the Billings and Northern R. R. We were taking out a side hill cut that had been coyoted and shot and everybody had nothing but praise for the way the cut looked after the shot, but one pocket missed. Well, we got started, Walker Jack Worth figured to top off the cut 12 feet from grade. We did that and then went after the bottom taking 6 feet at a time.

"We were about two thirds through when I moved up, taking one dipperful to the car, and when I looked at the pit there was a cloud of smoke that looked like a small volcano. I called to the craneman to jump and I did the same. Told the fireman and pitmen and we all ran back some 200 feet or more. We watched the smoke for what seemed like a few minutes when the smoke stopped. In the meantime The Walker came along and says, 'Well I think that is all.'

"We started back when . . . Bingo the 60 rose up, stood on her back end, and then settled down. To show the results I am enclosing four pictures of the wreck. The arrow points to myself. The dipper latch punched a hole in the top of boiler. Due to the shovel and dinkies working over it the powder dampened and burned which gave us a chance to get away. The remarkable thing about this, not one of us was even scratched.

"We had the machine in operation in 10 days and finished the job without any more accidents. The names of craneman and fireman I do not recall. The craneman was from Montreal, Canada.

"If any one remembers it I would like to hear from them."

Glad to have you with us Old Timer Reganold. Were any of our Old Timers on this job? If so, please drop Jack a line c/o Excavating Engineer.

FIELD NOTES

Quicksand Caused an Interesting Lawsuit

PROVIDENCE did not favor an excavation job in Providence, R. I. When a ditch for a sewer had been excavated to a depth of about 40 feet, a bed of quicksand was reached. Grooved plank sheathing was used in the ditch, but was not driven through the quicksand. As sand was removed from the ditch, its place was taken by sand flowing like water from under an abutting lot. The surface of the lot subsided, causing injury to a building on it.

The city was held liable. (Prete vs. Cray, 141 Atl. 609.)

The following abstract of the decision of the Rhode Island Supreme Court in this case will afford excavating contractors a bird's-eye view of the law of liability for causing the subsidence of adjacent property.

The first point of importance decided by the court is that a city is no more immune from liability for causing subsidence of adjacent soil than is a private individual. (And, of course, if a city is not immune from liability, there is no ground on which its contractor can claim immunity.)

The court then proceeds to show what courts throughout the country have decided as to when there is liability, and when there is no liability, for subsidence caused by excavation. The court concludes:

"Between adjacent owners, the general principle in this regard is that each has an absolute property right to have his land laterally supported by the soil of his neighbor, and if either in excavating on his own premises so disturbs the lateral support of his neighbor's land as to cause it, in its natural state, by the pressure of its own weight, to fall away or slide from its position, the one so excavating is liable. *This right of lateral support applies only to the land* of the adjacent owner, and *does not include the right to have the weight of the building placed upon the land also supported.* And when, upon an excavation made on his own land by an adjoining landowner, a building upon the adjacent land by its weight and pressure causes the building itself and the land upon which it stands to sink, then in the absence of negligence the one making the excavation is not liable for injury to the building resulting from its subsidence."

The court then comes to an interesting question, applying to cases where subsidence of soil is not due to weight of a building upon it, but to removal of adjacent land, and injury to the building results. On this point, the opinion reads:

"It has been held by a number of courts that a landowner by building upon his land has not thereby lost his right to have his soil supported, and, when that right is invaded by his neighbor, and his land sinks, he is entitled to compensation for the direct results of such breach of duty, including any injury to buildings upon his land, when such injury is due to an interference with the lateral support of the soil, and cannot be ascribed to the weight and pressure of the buildings upon the land."

The court followed this rule.

—Arthur L. H. Street, Attorney-at-Law.

Locate Rupture in Hose Lining Quickly and Easily

IN THE SMALLER sizes of water hose it is often a puzzling thing to correctly locate the stoppage due to a ruptured lining which suddenly plugs the tubing. One often cuts into places where the trouble is not. But you

can locate the bad lining quickly and accurately with any small steel bearing ball which goes nicely into the unspoiled portion. Drop the ball into the hose. Run it through, the hands pressing firmly on the rubber tubing. You can easily feel the ball where it has been stopped. It may of course be checked by swelled but still good lining. Tap it with a light stick and hammer. If you cannot move it further, there is one end of your stoppage. Three or four inches of the hose either way will be all you lose to get good lining when putting in the usual mender. A quick way to "X-Ray" your aggravating hose stoppage.

—Frank W. Bentley, Jr.

Circulating System Troubles

IF YOU HAVE TROUBLE with the cooling system on your shovel or other excavating equipment the following actual cases may be of help in locating the source of your difficulty.

Recently a contractor called in a service man stating that the motor on his shovel was heating even though the radiator was full of water and the fan belt was tight. The service man visited the job, found clean water being used and everything apparently in good order. Looking at the radiator from the outside of the machine it appeared to be clean. However, the man on the job had evidently overlooked that the machine was equipped with a pusher fan and, therefore, that the radiator should be looked at from the inside in investigating for dirt. The machine had been loading tar which is very dusty. The tar dust, drawn into the radiator from the inside by the fan, melted when the radiator became hot so that all the air passages through the radiator were stopped by a solid sheet of tar over the entire radiator core. Removing this completely eliminates the overheating.

Another contractor was having trouble with overheating of the motor on his shovel. The cylinder blocks and head were cracked due to the heat. The contractor replaced the cylinder blocks and heads but the motor still ran hot. An inspection disclosed that the hose connections had collapsed so that there was practically no water circulation through the motor. Even when replacing the cylinder blocks and heads the operator had failed to change the hose connections. Had the motor been allowed to work for another week or so with these old connections the new blocks and head would also have cracked. Whenever there is trouble with overheating one of the first things that should be checked is the condition of the hose connections.

EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year; Canada, $2.00 per year. SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, Excavating Engineer will be sent frequently (not regularly) free of charge. Only for those engaged in the industry of excavation.

The Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

E. M. HEUSTON
Advertising Manager

Printed in U. S. A.

The Business Situation

AT THE MOMENT we seem to be emerging from a wave of pessimism brought about by the reaction from a too rapid increase in business activity. If we are right in our assumption, the indicators of the next few weeks will show the beginnings of another rise.

The cause for the reversal of trend through which we have just passed and by which we lost approximately one-half of the ground gained since March, was without doubt a great increase in activity brought about by the threat of inflation in prices. While business activity was rising—from March to July—many interpreted the rise as a normal one due to the reviving of capital goods markets. It seems quite clear now that the rapidity of the rise was due in a large measure to the action of both the individual and industry in covering their future needs, rather than their present needs, in anticipation of price increases. We have apparently now dropped back to a business activity which is taking care of our present needs and, it should be pointed out that these present needs will increase as time goes on and optimism takes the place of pessimism. If we were to draw a line from the low point in March to our present position at the end of November, the rate of rise in that curve certainly gives us very little to be pessimistic about and the present indication of reviving optimism tends to suggest the beginning of another rise. If we were stolid enough to avoid the excesses caused by rapid alterations between optimism and pessimism, the curve of business activity would be smoother and a tremendous amount of hardship and worry would be eliminated.

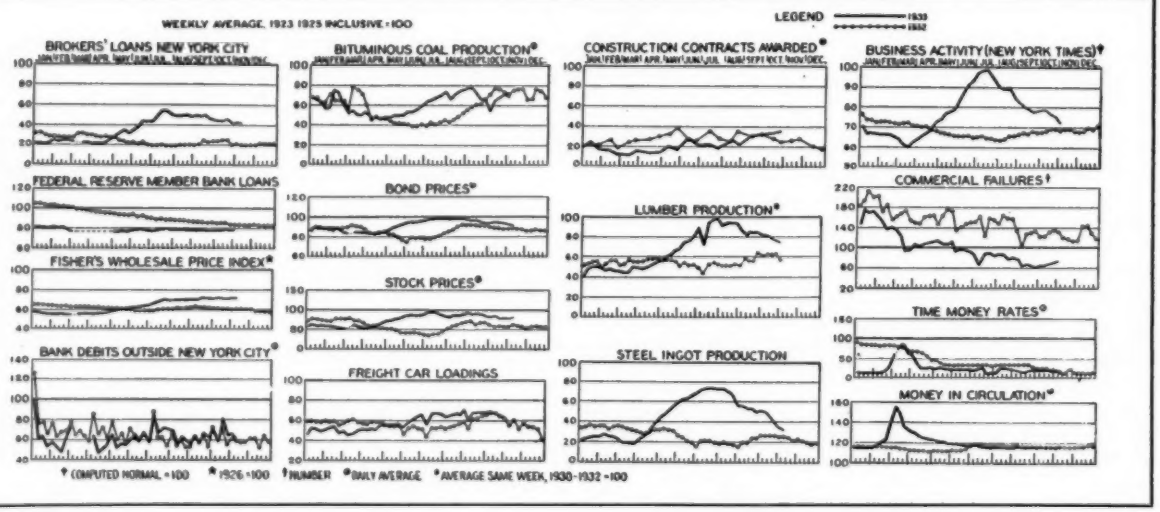
In the *Cleveland Trust Company's* business bulletin for November 15th is an item under the title of "Employment" which we quote in full.

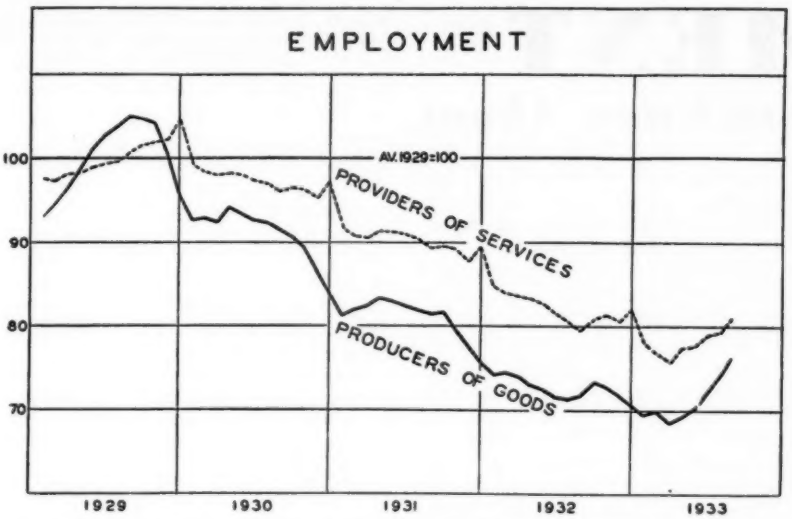
"According to the Census of 1930 there are about 49 million gainfully employed persons in this country in normal times. They are engaged in a great variety of occupations, but by regrouping the classifications used by the Census we may divide them all into two great groups not far from equal in numbers. The first consists of the producers of goods, and it includes about 26 million workers. In this group are the farmers, foresters, fishermen, miners, and those engaged in the numerous occupations of manufacturing and of building construction.

"The second group consists of those who provide services, and it includes about 23 million workers. In this second group are those engaged in transportation and communication, in wholesale and retail trade, in clerical work, and in the varied classifications of public, professional, domestic, and personal services. We do not have in this country inclusive reports telling from month to month how many people are unemployed in each occupational group, but we do have many official employment indexes reflecting conditions in numerous branches of business.

"The two lines in the diagram at the foot of this page represent the changes in employment during the past five years among the producers of goods and the providers of services. They have been computed by using all the employment indexes available, and assuming no unemployment in agriculture and fishing, and assigning to clerical workers the percentages showing conditions in wholesale trade. The percentages of the index numbers have been applied to the totals of the different occupational groups of the Census enumeration, and com-

WEEKLY BUSINESS INDICATORS


WEEKLY AVERAGE, 1923-1925 INCLUSIVE = 100
LEGEND
BROKERS' LOANS NEW YORK CITY
BITUMINOUS COAL PRODUCTION*
CONSTRUCTION CONTRACTS AWARDED*
BUSINESS ACTIVITY (NEW YORK TIMES)†
FEDERAL RESERVE MEMBER BANK LOANS
BOND PRICES*
LUMBER PRODUCTION*
COMMERCIAL FAILURES†
FISHER'S WHOLESALE PRICE INDEX*
STOCK PRICES*
TIME MONEY RATES*
BANK DEBITS OUTSIDE NEW YORK CITY*
FREIGHT CAR LOADINGS
STEEL INGOT PRODUCTION
MONEY IN CIRCULATION*
† COMPUTED NORMAL = 100 * 1926 = 100 † NUMBER * DAILY AVERAGE * AVERAGE SAME WEEK, 1930-1932 = 100



bined into two inclusive indexes for employment among producers of goods and providers of services.

"The results indicate that in September of this year there were about 10 million unemployed, of whom more than five million were producers of goods and less than five million providers of services. In numbers the two groups were not far from equal, but as constituent elements in the great depression problem they have entirely different kinds of significance. The difference is that the unemployment among the providers of services is caused by that among the producers of goods. If we think of the two groups as being equal in numbers we may say with near accuracy that one-half of the unemployment is caused by the other half.

"When smaller volumes of goods are produced, fewer workers are needed to transport them, send communications about them, trade in them, and do financial and clerical work concerning them and as a further consequence there are fewer opportunities for workers in professional, personal, and domestic services. If we could put the producers of goods back to work and keep them employed the providers of services would soon be reemployed also, and the depression would be over. About eleven-twelfths of the idle producers are employed in normal times in making durable goods and there is the depression jam key-log."

But it seems to us that there is still more to the picture than is mentioned here. Capital goods are usually purchased out of commitments against future earnings — borrowed money — and there are two things definitely needed before the volume can increase extensively. One, of course, is continued optimism on the part of the public and the other is change of The Securities Act to relieve the honest business organizer and promoter of a burden of proof that is almost the equivalent of prohibition.

One-Third PWA Highway Work Let

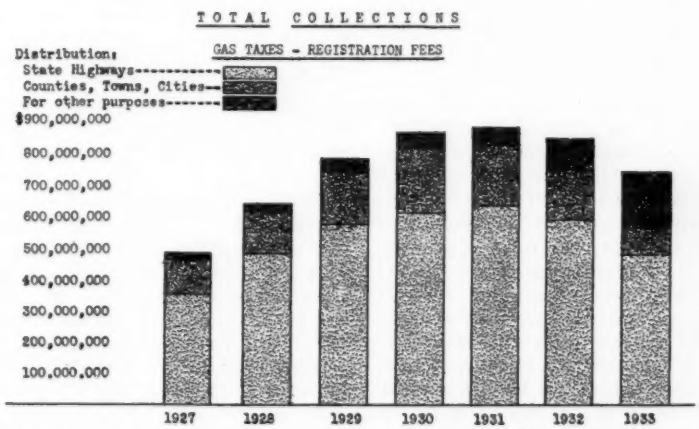
THE FIVE states which lead in the awarding of highway projects, financed by the $400,000,000 public works funds are New York with 67% of its allotment, Maine 66%, Nebraska 52%, Iowa 52% and Montana 50%.

Total contracts awarded in all states amount to $132,000,000 or 33% of the total.

Due to the fact the Federal government has been for many years in close contact with the highway programs of the states through the U. S. Bureau of Public Roads, highway work has made a better showing than any other class of public construction, in getting under way.

Secondary road work will be expedited considerably by recent rulings, and the Bureau hopes to have secondary and feeder road work amounting to $100,000,000 under construction by Jan. 1st.

Diversion of Highway Revenues



DIVERSION of motor vehicle funds to purposes other than highways increased more than 100 per cent in 1932 over the previous year and will probably double the 1932 figures during 1933 according to the American Road Builders' Association.

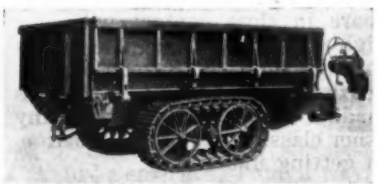
Inroads into highway funds have occurred in most of the states during the current year for one reason or another. These funds have been juggled by states, among the various departments, wherever there has been a shortage. Some of the revenue has been used for direct relief. Revenue transferred to counties, townships and cities for highway and street construction has, in many instances, found its way into other channels.

The situation is the result of lack of knowledge by the voters concerning the importance of continuing highway improvement, and the remedy is a highway educational campaign showing why the highway program should not be retarded. The accompanying chart shows what has been happening.

EQUIPMENT
You Ought to Know About

New 2-Way Athey Dump Trailer

ADVANTAGES never before presented in dump trailer equipment are combined in the new Forged-Trak 2-Way Dump Trailer, just announced by the *Athey Truss Wheel Co.*, 5631 W. 65th St., Chicago, according to the manufacturer. This new 2-Way Trailer is made in two capacities: 9 yard (10 yard rounded



load) adapted to "Caterpillar" Fifty and 12 yard (13 yard rounded load) adapted to "Caterpillar" Seventy Five. Outstanding features are the down-folding side gates that dump to right or left. These gates down-fold automatically during the first 18 degrees of the 53-degree dumping angle, providing unrestricted discharge of mixed or sticky materials.

Exceptionally low loading height in the new Athey 2-Way reduces loading time to a minimum; thus the center of gravity of body and load are also exceptionally low, producing great stability in dumping over soft fills. There is maximum water level capacity, with reduced overall width in order to facilitate passing on narrow cuts and fills. The trailer is an all-purpose unit, equally adapted to hauling sand, earth or rock. Material may be windrowed or spread in layers. The Forged-Trak wheels are standard, providing lighter running qualities that assure substantial savings in fuel, oil, and maintenance of tractor equipment. For any additional information write the manufacturer, mentioning *Excavating Engineer.*

New Development Makes Possible Bituminous Road Construction in Cold Weather

CONSTRUCTION of bituminous pavements during cold weather (barring snow and rain) is now entirely practicable due to a new process developed and announced by *Warren Brothers*, progressive highway engineers, of Boston, Massachusetts.

With the Federal Government's four hundred million dollar highway construction fund about to be fully unleashed, this is good news to hundreds of state, county and local highway departments who will be able, through the process, to press construction of thousands of new main and secondary roads uninterrupted by cold weather, thus keeping more men employed during the coming winter than has heretofore been possible.

This workability composition was developed especially to facilitate cold lay construction. Compression is readily obtainable. Heretofore, inability to secure adequate compression has precluded successful bituminous pavement construction during cold weather. In producing mixtures for subsequent shipment (cold) to point of use, the Workability Composition maintains "workability" as long as needed.

Workability Composition

Asphaltic mixtures in which this composition is used may be produced with any desired gradation from a coarse aggregate asphaltic concrete to a fine sheet asphalt. Its use requires no special equipment, as it can be used in any standard hot mix paving plant. The procedure is the same as with other hot mixes except that the temperature of the aggregate should be somewhat lower, under 250 degrees F., preferably at 200 degrees F. when introduced into the mixer. After the aggregate is introduced, the hot asphalt is added and allowed to mix until each particle is coated. The Workability Composition is then added in the amount of from 10 to 12.5% by weight of the amount of asphalt used. Where mixture is to be laid the same day it is mixed, the amount of composition can be reduced slightly below ten per cent.

Slightly less asphalt is used in these mixtures than normally required by standard specifications for the reason that the composition is a bituminous product which when added, becomes a part of the cementing medium.

The composition does not liquefy the asphalt but forms a film on the outside of each asphalt coated particle, which is at first non-cementitious and prevents the particles from adhering to one another until the composition has diffused through the asphalt. Later it hardens by oxidization rather than by volatilization and becomes a cementitious material thoroughly incorporated with the asphalt cement.

Its use permits the laying of hot mixtures with a high degree of workability at extremely low temperatures and it also permits production of any desired kind of cold lay paving or repair mixture which may be stored and used as needed. Its use in standard paving mixtures within the amounts specified in no way deteriorates or decreases the durability of the mixtures, in fact its use produces a more adhesive asphalt cement.

Traction Treads for Dual-Pneumatic Tired Equipment

FOR negotiating mud, sand, soft ground, snow and ice, the Warco J & S Traction Tread, manufactured by *W. A. Riddell Company*, Bucyrus, Ohio, has recently been announced. These

treads are for use on dual-pneumatic tires, are quickly and easily adjustable, having a self-locking toggle clamp with turn buckle adjustment for compensating tire wear and to provide for variation in size of tires. The tread plates do not mar or injure the tires in any way. The design permits the use of quickly detachable lugs or grouters in extreme conditions. The illustration shows the traction tread in place without lugs attached. For additional information write W. A. Riddell Company, mentioning this magazine.

SHOTS from the Firing Line

High Spots in the News

OF THE $70,000,000 allotted for river and harbor projects about $36,450,000 has already been awarded and work costing about $15,300,000 has been advertised but not yet placed. This leaves about $20,000,000 worth of river and harbor projects still to be brought out.

Among recent important allotments under the Public Works Act are included $4,000,000 for preliminary construction on the $18,912,000 Verde irrigation and power projects in Arizona and an allotment of $7,500,000 for a power and irrigation project in the Platte Valley, Nebraska. Large municipal projects include $750,000 for waterworks in Ogden, Utah, and $3,500,000 for water works in Denver, Colorado.

Approximately $30,000,000 is expected to be expended by the government for eradicating malarial swamp land and improving community sanitation in 21 southern states.

Highway Research Board Meets December 7th and 8th

THE THIRTEENTH Annual Meeting of the Highway Research Board will be held in Washington, D. C., at the building of the National Academy of Sciences and National Research Council on Thursday and Friday, December 7th and 8th, 1933. Tentative list of topics covered in the committee reports and papers to be presented include further studies of taxation and expenditures, highway transportation economics, design, materials, construction, maintenance, traffic and safety.

$400,000,000 to Civil Works Administration

TO GIVE immediate increase in employment the government has created a new agency to be known as the Civil Works Administration and financed it with $400,000,000 from the Public Works Fund. This money is to be spent on the small or scattered work not suited for handling by contract. Jobs to be carried out under the C. W. A. will in general be only those on which 85 per cent of the total cost is for direct labor.

Crushed Stone Code Signed

ON November 11th the President signed the Code of Fair Competition for the Crushed Stone, Sand and Gravel and Slag industries. The code became effective November 21st. Copies of the code may be obtained from the Government Printing Office at Washington for five cents each.

A. R. B. A. Convention in Chicago Next Month

ANNOUNCEMENT is made by the American Road Builders' Association that their Annual Convention is to be held during January 22, 23, 24, 25, 1934, at the Stevens Hotel, in Chicago.

Soil Erosion Program Gets Under Way

THE Soil Erosion Service, a new branch in the Interior Department operating with a $5,000,000 allotment from the Public Works Administration, is ready to proceed with actual field work of controlling soil erosion on a number of large representative areas scattered throughout the Nation. The size of these demonstration areas will range from about 100,000 acres to 15,000,000 acres (in the instance of the project to be undertaken on the Navajo Indian Reservation).

The areas thus far selected lie in the Piedmont Plateau of South Carolina, the Black Belt of Central Texas, the famous Palouse Wheat Belt of Washington and Idaho, southwestern Wisconsin, the Corn Belt of north-central Missouri and south-central Iowa, central Illinois and the Red Plains of central Oklahoma, with the Navajo project covering large areas in Arizona, New Mexico and Utah. Several other watersheds have been tentatively selected.

Costs of Highway Construction in Germany

AN INTERESTING SUMMARY of the cost of constructing an automobile highway in Germany has recently been prepared in the industry. A highway 122 kilometers (82 miles) in length formed the basis for these calculations.

It has been estimated 78 percent of the total costs are made up of salaries and wages. The wages at the place of construction represent 50 percent of the entire wage item, namely 42 percent for wages of 10,000 workmen for a period of two years, and 8 percent for wages of 180 clerks for a period of two years.

The construction material costs include a wage item of 15 percent and a raw material item of 11 percent. The construction equipment costs include a wage item of 8.3 percent and a raw material outlay of 5.6 percent. The costs of administration are made up to the extent of 5.6 percent by wages and 4.5 percent by raw materials.

December 14th Letting on All-American Canal for 4½ Million Yards

BIDS will be received at the office of the Bureau of Reclamation, Yuma, Arizona, December 4th for furnishing labor and materials and performing all work for the construction of earthwork, station 1130 to station 1340 on All-American Canal. The work is located from six to ten miles west of Yuma, Arizona. The principal items and the estimated quantities involved are as follows: 4,105,000 cubic yards of common excavation and 484,000 cubic yards of rock excavation. The work must be completed in 730 days. For particulars address the Bureau of Reclamation, Yuma, Arizona; Denver, Colorado; or Washington, D. C.

Hawaiian Notes

Bids will be received by the Bureau of Yards and Docks, Navy Department, Washington, D. C., until December 13th for dredging and disposing of approximately 5,500,000 cubic yards of material at Pearl Harbor.

New England Notes

By J. R. PARKER

The two steamers shown tackled a tough job when they started tearing down half a block of old buildings at Yale University, New Haven, Connecticut. The pictures were taken some time ago so that all the excavating has been completed at this writing. These Bucyrus-Eries are owned by C. W. Hannah & Sons, New Haven.

By E. D. COOGAN

The highway departments of the various New England States have been very active in the past month and bids for a number of large projects have

The Man with the Hoe

Written after seeing the painting by Millet

EDWIN MARKHAM

Bowed by the weight of centuries he leans
Upon his hoe and gazes on the ground,
The emptiness of ages in his face,
And on his back the burden of the world.
Who made him dead to rapture and despair,
A thing that grieves not and that never hopes,
Stolid and stunned, a brother to the ox?
Who loosened and let down this brutal jaw?
Whose was the hand that slanted back this brow?
Whose breath blew out the light within this brain?

O masters, lords, and rulers in all lands,
How will the Future reckon with this Man?
How answer his brute question in that hour
When whirlwinds of rebellion shake the world?
How will it be with kingdoms and with kings—
With those who shaped him to the thing he is—
When this dumb Terror shall reply to God,
After the silence of the centuries?

---

been opened. Work on some of these contracts has already commenced. The following are a few of the low bidders:

East Boston job (substructure of four bridges) to **A. Baruffaldi**, Somerville, Massachusetts; widening job on the Charlton-Oxford, Massachusetts, road to **The Lane Construction Corporation**, Meriden, Connecticut; Sterling, Massachusetts, road job to **Mario Pandolph**, Needham, Massachusetts; West Hartford, Connecticut, road job to **The Edward Balf Company**, Hartford.

B. Perini & Sons, Inc., Framingham, Massachusetts, have started work on the Arlington, Belmont and Cambridge job. The total of their bid was $556,931.18.

John Iafolla was low bidder on a new road between New Salem and Orange, Massachusetts, for the Boston Metropolitan Water Commission.

Herbert Wright is operating his Bucyrus-Erie Gas+Air on Coleman Brothers' job in Brookline-Newton, Massachusetts, and has encountered some very hard digging which the Gas+Air seems quite capable of handling.

The East Boston-Revere, Massachusetts, job on which all bids were rejected at the first letting has been split up. **A. G. Tomasello & Son, Incorporated**, of Boston, was low bidder on the major portion of the job when it was readvertised.

The Crandall Engineering Company, Cambridge, Massachusetts, was low bidder on the Lynn-Revere, Massachusetts, bridge job. This same concern is making good progress on the bridge job at Dover Point, New Hampshire. Mr. Blanchard is in charge of this work in the field.

Arute Brothers are making excellent progress on their job in Foster, Rhode Island. Their Bucyrus-Erie 43-B is turning out some big yardages and is being operated on two shifts—on one shift by Louis Williams and on the other by Fred Saucier.

John MacDonald, Highway Commissioner for the State of Connecticut, has announced that the **new Merritt highway will be advertised for bids** in the very near future. This undoubtedly will give some Connecticut contractors work to start them off next spring.

V. Barletta's Bucyrus-Erie 37-B machine is operating very efficiently on his job between Shutesbury-New Salem, Massachusetts. The machine has some very hard digging to contend with.

New York Notes

By G. E. PETERSON

New York State Highway lettings since October 24th have included the following jobs: 1.35 miles 40-foot concrete in Westchester County to **Garafano Construction Co.**, Mt. Vernon, $156,361; 7.38 miles 20-foot concrete in Broome County to the **W. G. M. Construction Co.**, New York, $298,942. This job includes 209,265 yards of excavation being the second-largest excavating job let this year. **Stanley Rosoff**, son of the well-known subway builder, Sam Rosoff, is the head of the W. G. M. Company, and will supervise the job. **Norwin Construction Corp.**, Maspeth, L. I., $171,589 for grade separation on the G. C. Parkway in Queens County, **Hogeboom & Campfield**, Utica, $150,575 for 3.82 miles concrete in Oneida County; **Winfield Contracting Corp.**, Winfield, L. I., $42,637 for grade separation on Interborough Parkway; **Tully & DiNapoli**, Astoria, L. I., $53,231 for grade separation on the Interborough Parkway; **Miller Bros.**, Hartford, $195,197 for 2.56 miles of concrete in Rockland County; **Binghamton Construction Co.**, Binghamton, $48,637 for 1.84 miles of grading and structures — Suffolk County; **Clevorock Corp.**, New York, $122,560 for grade separation on G. C. Parkway in Queens County, L. I.

Claude Donohue has been confined to his home at Kingston the past several weeks recovering from illness, but we understand he is about ready to get back on his job at Wells again.

The Poirer-McLain Co., New York, was low bidder on the west side Express Highway extension; their bid being around $1,500,000.

New Jersey Notes

By H. M. DAVISON

Geo. M. Brewster & Son, Incorporated, were recently awarded a bridge in Bergen County for $85,428; a construction job in Hudson and Bergen Counties on Route 3 for $164,522; paving route 6 in Bergen County for $148,212; a construction job in Bergen County on Route 6 at $246,337. On these contracts Bucyrus-Erie 37-B and 43-B gas machines are being used.

Franklin Contracting Company with a bid of $64,556 was awarded the contract for Paving Routes 21, 25 and 29 in Essex County. **S. J. Groves & Son** were awarded the contract for paving Route 29 in Somerset County at $172,161. **R. S. Sowerbutt** with a bid of $133,011 was awarded the contract for construction work on Route 29 in Hunterdon County.

Linde & Griffith are doing the pile work on Route No. 6 Bridge at Hasbrouck Heights. This is being done with their Bucyrus-Erie 42-B steamer and pile-driving leads.

Philadelphia and Vicinity

The American Dredging Company of Philadelphia secured contract for dredging 552,000 cubic yards from the Gloucester Anchorage in New Jersey for $283,968.

Baltimore and Vicinity

By STUART M. CHRISTHILF

The Bucyrus-Erie 32-B owned by **Christhilf and Ensey** of Baltimore is now starting digging on 40,000 cubic yards of excavation on Maryland State Highway project in St. Mary's County.

Pennsylvania Railroad Company has just been granted an allotment of $84,000,000 for the completion of the electrification work between New York and Washington. Baltimore gets a major portion of this work for, when the project was shut down about two years ago, the tunnels through here were just starting. Approximately 2,500 steel towers for carrying the wires must be placed in position. **The Arundel Corporation** of Baltimore has the contract for the tunnels and the towers through this section. Approximately $750,000 will be spent at Elkton, Maryland, for changes in lines and elimination of grade crossings. Contract for this has not yet been let.

Activity in this section due to the repeal of the 18th Amendment has been accelerated inasmuch as Maryland has always been a leader in distilleries, At least fifteen are now in the process of being remodeled or constructed.

North Carolina Notes

By A. W. EDWARDS

Hendricks & Kennedy, contractors of Charlotte, are moving their Bucyrus-Erie Diesel shovel from Franklin, where they recently completed a job, to Mount Airy. This new job was recently let by the Highway Commission, and was bid in under the name of Cobb & Homewood."

The City of Durham has recently received bids on one quarter million dollars' worth of sewer work. This is part of a three-quarter million dollar program to be financed with the aid of the Federal Government, and calls for quite a bit of both sewer and water works. At the first letting V. B. Higgins & Company of Charlotte, and William Muirhead Constr. Company of Durham, submitted the two low bids.

The Federal Government has quite a bit of construction under way, both at Fort Bragg and at Pope Field. The Atlantic Bitulithic Company of Washington, D. C., and F. L. Holcombe of Fayetteville are both actively engaged in the road and excavating end, while the following contractors are at work on barracks, warehouses, hangers, and other buildings: T. A. Loving Company of Goldsboro, J. E. Caudle of Mount Airy, J. A. Jones Company of Charlotte, Southeastern Construction Company of Charlotte, and the Gallimore Construction Company of Greensboro.

Leslie R. Ames, former Chief Engineer with the N. C. State Highway & Public Works Commission, and of the Louisiana Highway Commission, has recently joined the firm of Southern Paving & Construction Company of Chattanooga, Tenn. He is to be in charge of the work being done by this company in North Carolina. Everyone wishes Mr. Ames much success in this new venture.

Low bidders on seventeen North Carolina State Highway projects opened November 8th totaled $926,915. Out of this amount $149,319 represented low proposals on bridge construction. List of low bidders and projects follows:

Franklin County, grading and top soil 6.91 miles on route 59, **Pitt Construction Co.,** of Ayden; structures, **F. J. McGuire** of Durham.

Mitchell County, grading and crushed stone surfacing of 3.25 miles from Buladean to Tennessee State line, **T. M.**

The Man with the Hoe

By CLARENCE E. FLYNN

No longer in the field he stands
And leans upon his hoe.
He's put such futile tools aside,
He found them much too slow.
His blistered hands long since have healed,
Contented is his gaze,
No longer is his back bent down
As in the yesterdays.

He drives a big steam shovel now,
In comfort sits all day.
The hoeing days seem strange to him,
And very far away.
He feels swift power, wave on wave,
Each time the dipper swings;
He is the equal, not the slave,
Of masters, lords, and kings.

Strider & Co., of Nashville, Tenn. structures, **Elliott Building Co.**, Hickory.

Rutherford County, grading and top soil on 2.22 miles of route 20 at Bostic, **Wilson Construction Co.**, of Asheville.

Moore-Randolph Counties, grading and topsoil on 12.19 miles on route 705 from Hemp to Seagrove, **T. M. Strider & Co.**, of Nashville, Tenn.

Anson-Richmond Counties, grading and top soil on 2.29 miles of No. 515 at Pee Dee river, **C. A. Ragland**, of Louisburg; structures, **J. S. Bowers**, of Whiteville, N. C.

McDowell, Burke and Avery, grading and gravelling of 3.52 miles on No. 28 from Linville Falls to Altamont, **C. A. Ragland** of Louisburg; structures, **Barger Bros.**, of Mooresville.

Cleveland County, bituminous surfacing of 11.50 miles on No. 190 from Shelby to Polkville, **Brown Paving Co.**, of Lexington.

McDowell County, grading and crushed stone of 5.46 miles of No. 19 from Wild Acres to Gillespie Gap, **T. M. Strider & Co.**, of Nashville.

Nash County, bituminous surface and structures on 9.65 miles of route 43 between Aventon and Red Oak: roadwork, **Gregory-Chandler Co.**, of Virgilina, Va.; structures, **Cobb & Homewood** of Chapel Hill.

Nash county, bituminous surface and structures on 10.14 miles of route 95 between routes 581 and 58; **Kiker & Yount** of Reidsville.

Onslow County, grading and structures of 6.91 miles on route 24, roadwork to **West Construction Co.**, of Kinston; structures, **J. S. Bowers**, Whiteville.

Pender County, sand asphalt surface and structures on 5.51 miles of route 201 near Burgaw; roadwork, **Southern Paving Construction Co.**, of Chattanooga, Tenn.; structures, **J. S. Bowers**, Whiteville.

Person County, grading, top soil, and structures on 6.71 miles of route 59 from Warren County line to route 501; roadwork, **Nello L. Teer**, of Durham; structures, **Cobb & Homewood**, Chapel Hill.

Davidson County, bituminous surface on 11.04 miles of route 109 near Thomasville; **Hardaway Contracting Co.**, of Columbus, Ga.

Rockingham County, bituminous surface on 11.70 miles of route 708 from Madison to Wentworth; **Leon Ellis** of Greensboro.

Mecklenburg County, structures on route 15, near Charlotte, **F. A. Triplett** of Chester, S. C.

Cleveland County, bituminous surface on 8.60 miles on route 182 from Fallston to Polkville; **Brown Paving Co.**, of Lexington.

The U. S. Engineers Office at Wilmington received bids November 30th for the $1,520,000 **lock and dam on the Cape Fear River.**

Florida Notes

By D. L. WHITEHURST

Contractors on **six waterways projects** directed by U. S. Army engineers have moved men and equipment on the jobs within the last 30 days, it has been announced by Major Beverly C. Dunn, district engineer, with offices in Jacksonville. The jobs, totaling more than $8,000,000, were let late in September.

In Tampa the **Atlantic, Gulf and Pacific Corporation** of New York is widening and dredging the harbor channel. It is a $700,000 job.

In Miami the harbor turning basin is being deepened by the **Clarke Dredging Company** of Miami at a cost of $125,000.

At Fort Pierce, on the east coast, the **Parkhill Dredging Company** of Jacksonville is constructing a jetty at the harbor. The bid was let at $204,000.

On the St. Johns river at Jacksonville the **Atlantic, Gulf and Pacific Company** also has a contract for dredging 3,000,000 cubic yards of dirt. The contract was let for $273,000.

The Standard Dredging Company of New York is gathering crews and equipment at the south end of Lake Worth, Palm Beach county, to dredge the intracoastal channel. It is a $735,000 contract.

Another job leading into Lake Worth has been let to the **Arundel Corporation** of Baltimore for $460,000.

The Federal **levee project for Lake Okeechobee**, originally designed to expend $9,000,000, will run considerable higher, U. S. Engineers have said. At the present three contractors are on the levee jobs. The contracts were let earlier in the year.

Harbor projects for Pensacola harbor and St. Andrews Bay involving approximately $750,000 are being completed in the Mobile office of the U. S. engineers.

The Florida State Road Department has **put to work more than 2,000** residents of the state on National Recovery projects within the last two months. More than a score of projects have been contracted by the department which has been alloted slightly more than $5,000,000 for the work by the Federal government.

Pittsburgh and Vicinity

The U. S. Engineers Office is receiving bids until December 12th for the construction of the Montgomery Dam on the Ohio River.

Allegheny County is preparing a county-wide Public Works program to cost approximately $30,000,000. A loan will be requested from the P. W. A. to carry out the work. Principal items include five bridges over the Allegheny, Monongahela and Youghiogheny Rivers, main highways connecting these bridges, reconstruction of the Wabash Railway bridge for highway traffic, a tunnel from the down town district to the South Hills district, a highway grade separation at the south end of the Liberty tunnel and an elevated highway and viaduct along the Monongahela River.

Ohio Notes

By HENRY F. UNGER

Bids for the building of huge digester tanks in connection with **Cleveland's new $14,000,000 East Side sewage project** have been received. **The Hunkin-Conkey Construction Co.** held the lowest bid of $1,091,113 if stone or gravel is used in the concrete and $1,081,163 if a slag aggregate is used. The Highway Construction Company held the second lowest bid of $1,097,223 on stone and gravel concrete mix, and $1,088,897 for the slag aggregate. Excavating will start as soon as the contract is awarded. Both firms agreed to completion of work by November 1, 1934.

Michigan Notes

In the November election Detroit voted to spend $87,854 on the **construction of 20 miles of subway.** A loan secured by mortgage bonds on the lines to be built will be sought from the Public Works Administration.

Wayne County voters also created a Board of Detroit Authority empowered to issue $60,000,000 in bonds. The new organization will engage in the development of the ports and harbors of the county.

Great Lakes Dredge and Dock Company, bidding from their Cleveland office, secured dredging of the Toledo harbor on their bid of $704,340.

- By CLYDE B. DAVIS

Ann Arbor, which is dumping its sewage into the Huron river, has been granted a $650,000 loan from the Federal Public Works Administration for a sewage disposal project which will keep about 250 men, or most of the city's unemployed, busy 18 months. The project includes a large downriver sewer, for which digging operations will be started soon, and a sewage disposal plant on the Huron River and a pumping station. The city by bond issue is adding $550,000 to the Federal grant to complete the job.

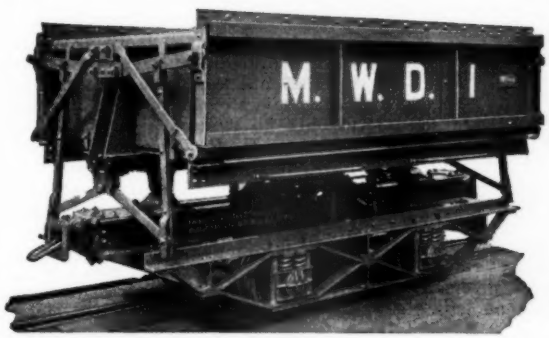
Detroit is **proceeding with plans for a grade separation** at Grand River Avenue (a state trunk line highway) and Grand Boulevard, said to be the most congested travel spot in the world exclusive of certain superhighway crossings in tourist seasons outside metropolitan districts. A count in 1932 showed a 12-hour average of 63,381 vehicles.

Widening of Woodward avenue in Detroit has been held up while the state and county decide which government is to provide the initial funds. Meanwhile, the daily cost in interest to taxpayers on awards amounts to $1,200. This has been going on four years.

A huge grade separation project is being seriously considered by the state as a substitute for the $25,000,000 instiiutional building program which seems certain to be defeated. Legislative leaders are backing the new plan, to be presented at the next session of the legislature. It is argued that maximum employment with minimum of construction expense and maintenance, and the added facility and safety of highway travel will be compelling factors in drawing sufficient approval of the program.

The highway committee of the state administrative board has **approved four**

When the Going is Tough



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Shots From the Firing Line— *Continued*

road construction projects totaling more than $150,000: Oakland county—.591 mile of grading and asphalt on M-59 in Pontiac to the Michigan Asphalt Paving Co., Royal Oak, $30,-373; Menominee county—.929 mile 20-foot concrete grading and paving on U. S.-2 north of Powers, to Delta Contracting Co., Escanaba, $27,774; Gogebic county—3.419 miles 20-foot grading and concrete pavement on U. S.-2 southeast of Wakefield to L. W. Brumm, Marquette, $74,549; Iron and Houghton counties—6.473 miles of 16-foot gravel on Federal Forest Highway 16, to Frank Tschury, Autrain, $22,493.

Indiana Notes

By C. BRUCE McCOWAN

At the State Highway letting November 7th: Project 53, Section B, Perry County, metal fill retainer complete in place went to **Hanson Bros. Inc.** of Evansville for $5,326 against engineers' estimate of $6,262. **Harry A. Carpenter** of Brazil took Project 174, Section D1, drainage in Warrick County at $10,871 against the estimate of $13,004. Mr. Carpenter bid 1,661 cubic yards of class 1 excavation and 566 cubic yards of class 2 excavation at $2.72 per yard against estimates of $3.00 on class 1 and $3.50 on class 2.

Bidding $29,967 against an estimate of $36,939, **H. D. Sommers & Co.** of Indianapolis was low on NRA Project 400, in Marion County. This was figured at 30 cents per on 6,895 yards of earth excavation, 6 cents on 1,188 lineal feet of shoulders and ditches, $1.41½ on 2,000 square yards of concrete paving and $1.84½ for 10,706 square yards of winter concrete. Estimates on these items were 40 cents, 15 cents, $1.86, and $2.28.

Heiny and Roper of Gary wanted NRA 94A in Warren County for $83,-482 though the engineers said it was worth $132,626. The contractor bid 21 cents on 27,899 yards of grading estimated at 37 cents and 25 cents on 288,-845 yards of borrow estimated worth 40 cents.

H. C. Halstead of Indianapolis made the low score on PWA 156 B consisting of 4.779 miles of paving in Lawrence and Jackson County bidding $111,962. The estimate was $138,039. Excavation, earth, 7,571 yards estimated at 40 cents went at 45 cents; shoulders and ditches, 25,059 lineal feet estimated at 15 cents went at 16; concrete paving, 57,-133 square yards, estimated $2.24 bid at $1.79.

U. R. Price and Co. of Bloomington figure they can make money at $110,-351 on PWA 156 C, which consists of 4.672 miles of paving in Jackson County. The Highway Commission figured it at $126,628. Unit prices were earth excavation, 7,401 yards, estimated at 40 cents, bid at 33 cents; shoulders and ditches, 24,669 feet, estimated at 15 cents, bid at 20 cents; concrete pavement, 55,434 square yards, estimated at $2.10, bid at $1.80.

On PWA 275, 4.812 miles of paving Ripley County went to **Robins, Gregory and Company** and **Hart and Hart** of Columbus. Bid $140,833 against the state's figure of $147,526. The work includes 25,649 yards earth bid at 45 cents; 4,503 yards shale bid at 80 cents; 3,273 yards rock at 80 cents; 25,526 lineal feet of shoulders and ditches at 17 cents; 56,951 square yards of concrete pavement at $1.75. The state's figures were $.40, .65, 1.00, .15 and 1.95 respectively.

Bontrager Construction Company of Elkhart bid low on the 2.397 miles in Tippecanoe County known as Section C, PWA 324. Bid totaled $68,748; 40,-464 yards earth at 30 cents, 4,320 yards borrow at 35 cents, 12,759 lineal feet shoulders and ditches at 10 cents, 28,-466 yards concrete pavement at $1.58. The engineers estimates were 40, 45, and 15 cents, on the dirt with $1.79 on the paving, total $80,842.

PWA 346 totaling 7.321 miles in Adams County belongs to **Meshberger Bros. Stone Co.** of Linn Grove at $169,-095. They figured 40,300 yards of earth at 30 cents, 60,357 yards borrow at 28 cents, 38,777 lineal feet shoulders and ditches at 10 cents and 79,543 square yards paving at $1.51. The engineers guessed 40, 45, 15 and 1.96 on the various items and totaled it at $224,132.

Roger Daoust of Defiance, Ohio bid $265,566 on PWA 348 A of 13.032 miles in Cass and Fulton Counties. He figured 118,573 yards earth at 30 cents, 30,430 yards borrow at 35 cents, 19,769 yards peat at 15 cents, 69,737 feet shoulder and ditch at 12 cents and 114,-218 square yards concrete pavement at $1.55. Highway Department estimates were 40, 45, 30, 15 and $1.91—total $329,159.

R. P. Olinger of Huntingburg was low on PWA 319 A 10.387 miles in Warrick County. The bid: 154,124 yards earth at 34; 21,309 yards shale at 50; 9,552 yards rock at 50; 10,923 yards borrow at 34; 56,112 yards shoulder and ditch at 10; 19,814 cubic yards gravel surfacing at $2.50; total $176,-947. Estimate was 40, 65, 1.00, .45, .15 and 3.63; total $219,347.

Calumet Paving Co., Gary, was awarded two sections of the Paoli-Salem job. **Skinner Bros.** of Morocco, Ind. and **Ed. Locke** of Bedford, Ind. are excavating on the Paoli section. **Calumet Paving Co.** is excavating the Salem section.

U. R. Price and Co., Bloomington, low bidders on the middle section of the Paoli-Salem job, have started excavation on this section. **Joseph Voto**, Clinton, Ind. was awarded contract for a bridge in this section.

George Sparling, Fort Wayne, has another large excavating job near Logansport which he expects to start as soon as awards are made.

By H. E. SNIPE

Bedford Contracting Company operations at Bedford, Indiana, are shown

above. They are stripping limestone for the St. Louis Post Office building and load to Mack trucks with their Bucyrus-Erie Gas+Air shovel.

By DAVID I. DAY

Highway contracts exceeding $100,-000 each were let by the Indiana State Highway Commission to a number of prominent contractors, and in many of these jobs, passersby may note Bucyrus-Erie equipment helping to do the "dirty work." The largest of these jobs from a dollar angle is a six-mile concrete project on State Road 56 through Livonia in Orange and Washington counties. **U. R. Price & Company** of Bloomington landed this award on a bid of $186,549. The same contractors got a contract in Jefferson County at $139,742. This is another concrete road 5.47 miles in length.

Near the last-named Price contract is another project, a piece of concrete road construction 7.09 miles long, let to **Robinson, Gregory & Company** and **Hart & Hart** of Columbus, Indiana. Their bid was $171,563. All in all, there will be a lot of highway work in operation down in the scenic hills around Madison and this should lighten up the unemployment situation considerably.

Other road contracts in the "$100,000 and over" class let by state authorities in October are: 6.72 miles of concrete in Rush County to **Grace Construction**

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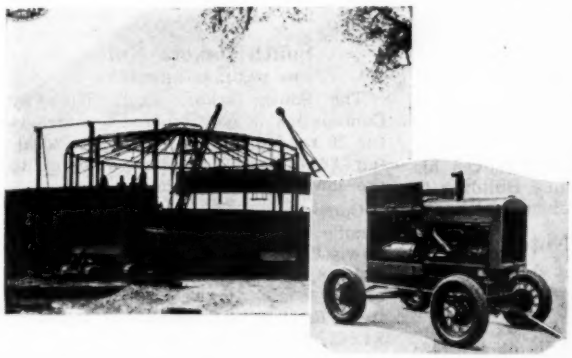

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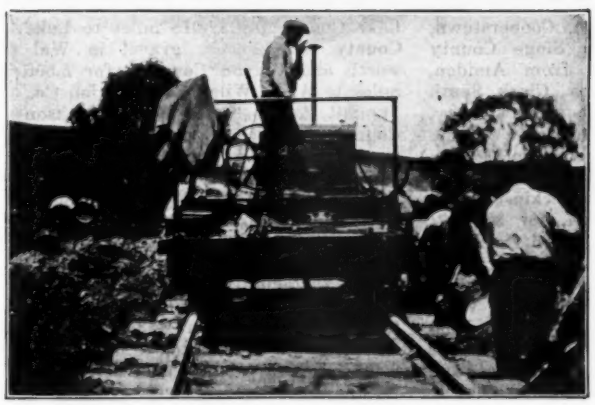

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Shots From the Firing Line— *Continued*

Company, Fort Wayne, at $129,795; for 5.51 miles concrete in Rush and Henry counties to **Grace Company** at $123,795; for 5.04 miles concrete in Floyd County to **Robinson, Gregory & Company** and **Hart & Hart**, Columbus, at $155,591; for 5.71 miles concrete in Jennings County to **Williston Contract Company** on a bid of $114,183; a grading and structures job in Clay and Owens counties, a road of 10.52 miles length, to **Central Construction Company**, Campbellsburg, at a price of $108,991.

Smaller contracts in various parts of the state were awarded to the **Vinton Construction Company**, Fort Wayne; to **Pronger Construction Company**, Blue Island, Illinois; to **Feigel Construction Company**, Evansville, Indiana; to **John Dehner, Inc.**, Fort Wayne; and to the **Williston Contract Company**, South Bend.

The State Highway Commission will itself construct a 4.48-mile concrete road in Union County, work figured at about $191,000.

The Globe Construction Company at Evansville is at work giving a concrete surfacing to the approaches of the Ohio River Bridge near Evansville, the object being to protect the approaches from action of the river when the water is high.

Four bridge awards were for over $25,000 each. These are to the **Moellering Construction Company**, Fort Wayne, at $45,484 for a bridge and approaches in Montgomery County; to **E. A. Mariani Company**, Richmond, for a Union County bridge on a low bid of $49,480; to the **Vincennes Bridge Company**, Vincennes, on a Hamilton County bridge at $38,741; to **I. E. Smith**, Richmond, for a bridge near Liberty in Union County at a price of $28,521.

Smaller bridge contracts were landed by **A. G. Ryan & Sons**, Chrisney; **Harold Tharp**, Fountain City; **H. L. Maddocks**, Newark, Ohio; **K. P. Sithen**, Garrett; **J. E. Sweet & Sons**, Woodburn; **J. C. Jarrett**, Lynn; **Joseph Voto**, Clinton; **E. O. Jackson**, Elizabethtown; **Henry V. Hay**, Boonville, and **L. E. Jordan & Son**, Oaktown.

Good reports have come to your correspondent on a number of completed projects, including the Crown Point job of the **Gast Construction Company** and the new road built by **A. C. Proudfoot** at Michigan City.

Federal money under the recovery program accounts for the increased number of contracts let and accounts, too, for many projects of various kinds soon to be under way by counties and cities. Some criticism has been loud on account of the slowness of getting these projects under way with winter a certainty and so many out of work. There are signs in sight now that speedy use of available funds will be in evidence over Indiana and the work thus provided will surely be a blessing to thousands of people.

County maintenance authorities in some counties have run out of money and men have been laid off just when the roads needed work and people needed jobs. With the turn of the new year, it is to be hoped that these maintenance crews over the state will be back on the job.

Illinois Notes

Robert S. Hale, consultant on the welding of steel structures and the remodeling and reinforcing of existing structures by welding, has moved his office from the Old Colony Building to 1432 W. Lake Street, Chicago, Illinois.

Minnesota Notes

Low bidders on recent state highway grading jobs include **Adolphson and Huseth** of Thief River Falls, 121,600 yards at $24,758; **Ira A. Cox**, Minneapolis, 101,000 cubic yards at $19,743; **John Runquist & Son** and **Geo. Campbell Company** of Duluth 117,000 cubic yards at $48,333.

North Dakota Notes

By PAUL G. FRIGGENS

Lettings totaling $307,893 on 87.52 miles of road work were held in North Dakota during November. Contracts were awarded as follows:

In Logan County, 8.396 miles, grading and structures, south of Streeter, to **Studer & Manion** of Bismarck for $34,139; in Wells County, 7.341 miles, grading from Cathay South to **Wm. Fahey**, Lakota for $19,805; structural work to **T. M. Wingen**, Cooperstown, N. D. for $3,214; in Slope County 10.442 miles, grading from Amidon, southwest to **Dowd Bros.**, Clark, South Dakota for $34,051; in Slope County, structural work to **Dickinson Ice & Transfer Co.** of Dickinson for $18,197; in McKenzie County, 8.592 miles, grading at Grassy Butte to **Dickinson Construction Co.**, Dickinson, for $25,217; also another job for $4,586; in Ward County, 1.323 miles grading and graveling west of Minot, to **Win Coman**, Goodrich, for $18,104; in Ward County, structural work to **D. B. Huston**, Minot, for $12,908; in Barnes County, 1.86 miles grading and graveling at Valley City and east to **W. H. Noel & Co.**, Jamestown, for $17,588; in Barnes County, structural work, all bids rejected as too high; in Pembina County, structures and approaches, south of Mountain to **C. L. Lindberg**, Jamestown for $12,633; in Ward County, 0.596 miles, grading and graveling in Minot on R. 83—held for further consideration; in Williams County, 1.152 miles reinforced concrete pavement at Williston, all bids rejected as too high; in Ramsey County, 9.626 miles, oil mix and stock pile north of Devils Lake to **Northwest Construction Co.** of Fargo for $54,898; in Cass County, 6.285 miles gravel surfacing and stock pile, Page to Colgate, to **Advance Construction Co.** of Fargo, for $7,191; in Oliver County, 6.188 miles gravel surfacing and stock pile Center west to **W. H. Noel & Co.**, Jamestown, for $7,702; in Burke County, 11.038 miles, gravel surfacing and stock pile S. of Columbus to **Wilder and Wilder**, Jamestown for $16,835; in Hettinger County, 14.652 miles gravel surfacing and stock pile, Regent west to **Butler Construction Co.**, Grand Forks, for $20,817.

South Dakota Notes

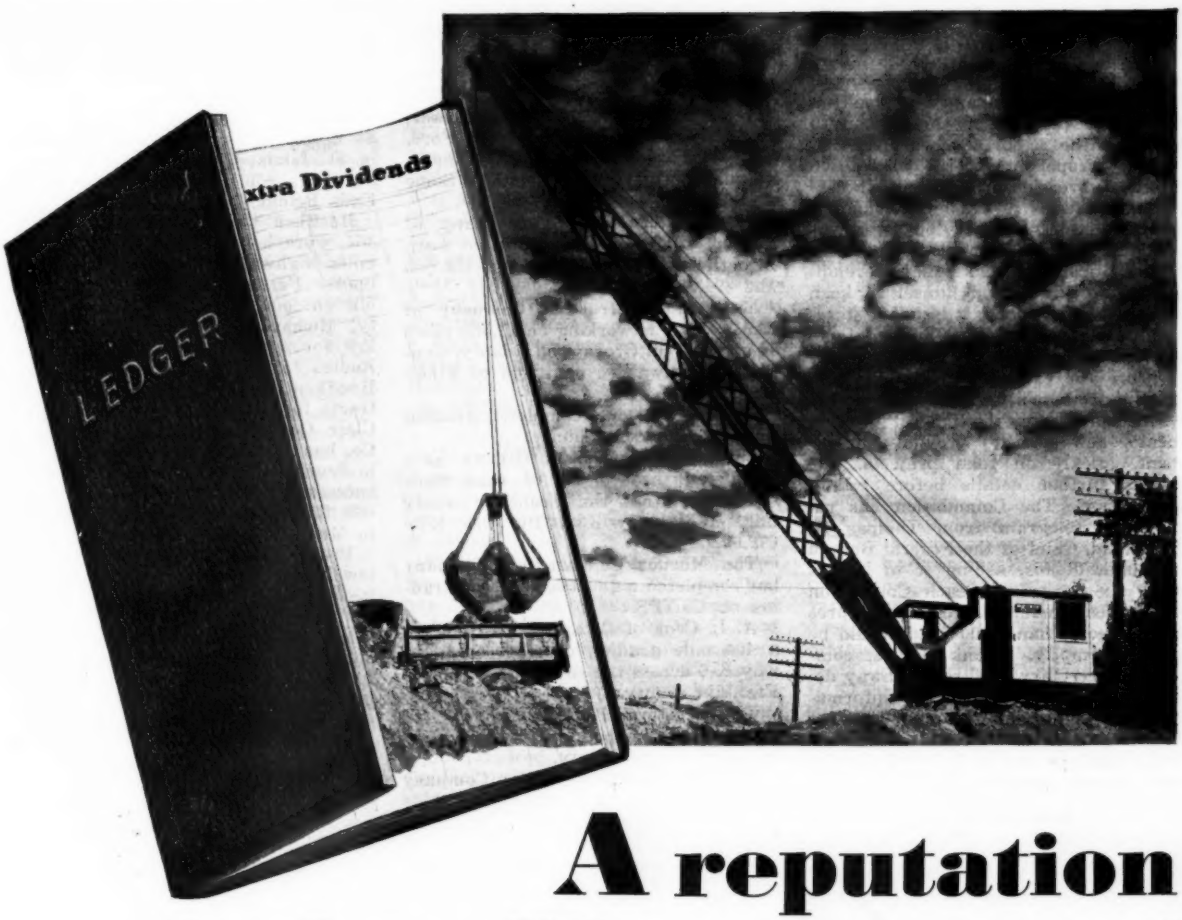
By PAUL G. FRIGGENS

The South Dakota State Highway Commission in November, **let contracts for 20 road projects** in the state totaling $417,961. Contracts were let to the lowest bidder in each case.

Concrete paving — 0.689 miles in Beadle County to **States Engr.** and **Lewis Construction Co.**, Rapid City for $20,168; grading and gravel surfacing of 0.315 miles in Charles Mix County to **C. E. Weir and Co.**, Sioux Falls for $4,861.12; grading and graveling surfacing in Walworth County for 1.428 miles to **Walworth county** for $6,906.

Grading in Hughes County for 4.986 miles to **Dowd Bros.**, of Clark, for $43,877; bridge in Minnehaha County to **Northwestern Engr. Co.**, Rapid City for $50,058; bridge in Dewey County to **M. A. Stump** of Mobridge, Montana, for $10,001; bridge in Hughes County to **W. H. Pringgle** of Pierre for $5,122; base course, in Brown County for 17.643 miles to **C. A. Wagner Construction Co.**, Sioux Falls, for $13,197; gravel in Beadle County for 10.218 miles to **Central Construction Co.**, Sioux Falls for $16,490; gravel in Lake County for 13.018 miles to **Lake County** for $18,869; gravel in Walworth and Corson Counties for 5.596 miles to **A. E. Wiley Construction Co.**, Summit, for $5,296; gravel in Jackson County for 11.690 miles to **Northwestern Engr. Co.**, Rapid City for $25,181; gravel in Charles Mix County for 14.209 miles to **C. E. Weir & Co.**, Sioux Falls for $26,545; gravel in Bon Homme County for 11.938 miles to **Lindekugel and Kolbert** for $23,165; gravel surfacing in Harding and Butte Counties to **T. J. Tobin Construction Co.** for 21.934 miles at $43,689; gravel surfacing in Penington County for 8.498 miles to **Inland Construction Co.**, Omaha, at $24,376; gravel surfacing in Buffalo County for 11.7 miles to **Larson Eng. Co.**, of Sioux Falls for $16,342; gravel surfacing in Clark County for 10.071 miles to **Clark County** for $14,019; resurfacing in Pennington County for 24.443 miles to **S. S. Roberts** of Flandreau for $28,782 and in Bennett Co. for 13.204 miles to **Summitt Construction Company** of Summit, for $20,008.

Successful bidders on these projects in the National Recovery and Emergency Construction projects will be **required to maintain a minimum wage scale** of forty-five cents per hour for all unskilled labor and fifty-five cents an hour for all skilled labor. The wage scale on all re-surfacing work shall not be less than thirty cents an hour for all unskilled labor and forty cents per hour for all skilled labor. No skilled



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Shots From the Firing Line— *Continued*

or unskilled labor shall work more than thirty hours in any one week on the former projects nor more than 40 hours on the re-surfacing projects.

While proponents of the $65,000,000 Missouri diversion program were pressing their claims in Washington before the public works advisory board, in November, Will G. Robinson, President of the Upper Missouri Valley Development Association and himself a keen student of the whole-set issued a statement declaring he could find no facts presented that would justify in "any measure the expense involved."

South Dakota's highway commission will cooperate in the federal government's new plan to provide employment quickly on road projects, but awaits further details before taking any action. The Commission has received a telegram from Thomas H. McDonald, Chief of the Federal Bureau of Public Roads, asking it to list at least six projects in each County on which road maintenance expenditures of not more than $5,000 each could be made promptly. Frank Kriebs, commission secretary, said the highway department wired for further information. The new plan was announced at Washington as part of the administration's attempt to put 4,000,000 men to work before January 1st.

Kansas Notes

By E. W. SHUCK

The accompanying illustration shows a Bucyrus-Erie 32-B owned by **T. F. Marbut** of Emporia, Kansas. This machine was used as a dragline on a river change at this point, as a clamshell for material and pier excavation and in addition was used to pull and drive sheet piling and for the erection of the steel I-beams. The bridge consists of seven 90-foot continuous I-beam spans and crosses the Chishaska River near Caldwell and Corbin, Kansas. Mr. Marbut recently purchased a chain-crowd shovel attachment for the machine and will soon begin work with it at Lebo, Kansas, on a 96,000-yard dirt job there. The work includes some quite sizable cuts. We understand that the contractor is well pleased with the performance of this 32-B.

By ERNEST W. FAIR

Allotment of **$2,100,000 in Federal funds** for emergency and construction work in 12 southwestern Kansas counties has been begun by the state highway director. Work will be in Meade, Clark, Comanche, Barber, Kiowa, Ford, Gray, Edwards, Hodgeman, Finney, Kearney and Hamilton counties. Some has already been begun.

The Western Paving Company of Denver, Colorado, has completed work on highway 73W. Their bid on the job was $94,951.

McGlone Construction Company of Kansas City is working on 11.563 miles of highway in Greenwood County. Contract was awarded on a bid of $136,-485.

F. H. Freeto has completed grading work in Anderson County.

Cook and Ransom of Ottawa have completed three miles of road work southwest from the Franklin county line on highway K33. Bid was $30,-672.69.

The Marbut Construction Company has completed a $39,955.40 job of grading on Us.TPS.

A. L. Cook of Ottawa is working on a 404 mile grading contract on highway K-6 across the southeast corner of Franklin county.

The Western Paving Company of Denver has finished a 2.644 mile job in Montgomery County.

The Sherwood Construction Company of Independence has completed their U. S. 160 highway job east of Independence. Bid was for $44,652.

FRANK BROWN

Frank Brown, 65, Coffeyville contractor, died in Independence early October 21st in a hospital of injuries received in an automobile accident in which eight others were hurt.

The Woods Brothers Construction Company of Lincoln, Neb., won the contract for construction of 4,710 feet of dikes and 1,000 feet of revetment at the Providence and Sandy Hook bends of the Missouri between Kansas City and Hermann. Bid was for $189,041.

The Roberts Construction Company of Wichita has completed thirteen miles of road work from Mount Hope south and east to Wichita.

The Yant Construction Company of Omaha, Neb., has completed 27 miles of road work from the intersection of K-42 and K-49 east and north to the city limits of Wichita.

St. Louis and Vicinity

By A. J. KOENIG

The Missouri State Highway Department **received bids** October 28th on **160 road construction projects** involving an expenditure of over $1,550,000. This letting, in the number of projects involved, was the largest in the history of the department. The letting called for 195 miles of graded earth and 328 miles of gravel surfacing. Another letting involving 52 projects is set for November 17th.

Secretary of War Dern has approved an application for the **construction of a bridge across the Mississippi River** by the City of East St. Louis, Illinois. The project calls for a bridge from Fourth and Missouri Avenue in East St. Louis to Third and Franklin Avenue in St. Louis. The bridge if built will be about 900 feet above the notable Eads Bridge.

Hoeffken Bros., with a bid of $24,-364, were low bidders for paving 1.13 miles highway in St. Clair County, Illinois. **Parham Construction Co.** was low on four bridges in Madison County; **Richardson Construction Co.** was low for a grade separation bridge on Routes 157 and 11 in Madison County. **Hoeffken Bros.** were also awarded contracts for three paving projects in St. Clair County. **Egyptian Construction Co.** has contracts for two paving jobs in Franklin County; **File & Collins** were successful bidders, with a bid of $148,-003 for concrete paving on Route 104 in Morgan County, Illinois.

Fruin-Colnon Construction Co. was low bidder for the construction of the last section of the River Des Peres drainage project in St. Louis. This section consists chiefly of rip-raping the banks, widening and placing two reinforced concrete piling bulkheads to prevent scouring. The low bid was $99,-455; engineers estimate $100,000.

The Board of Public Service, St. Louis, will receive bids about Nov. 28th for constructing double tracks on railroad deck of bridge, replacing ties, switch materials, rails, and signal apparatus on East St. Louis Union Station railroad approaches to Municipal Bridge across Mississippi River, between East St. Louis and St. Louis including double track approach and double track extension of western approach of bridge to Terminal R. R. yards. C. E. Smith & Co., St. Louis, engineers.

The Labor Advisory Board rules that river contractors working within 25 miles of St. Louis must pay union rates of $1.25, $1.35 and $1.47 per hour for pile driver operators. Accordingly bids for 8 Missouri River dike and revetment jobs in this area were rejected and new bids called for based on the new scale.

Kentucky Notes

By W. E. CHAMBERS

Nineteen N. R. A. and two state projects were let by the State Highway Department on the 14th. The awards went to: **Codell Construction Company** of Winchester, 5.2 miles grading for $33,434; **Blair and Franse Construction Company** of Lexington, 4.3 miles grading for $27,000; **J. B. Westerfield** of Owensboro, 5.2 miles grading and drainage for $29,000; **McDade and McDade**, 3.6 miles surfacing for $10,003; **Whitehead & Terry** of Crofton, 5.4 miles grading and draining for $27,533; **Mack M. Hopson**, 4.5 miles surfacing for $14,195; **Ralph E. Mills & Co., Inc.** of Frankfort, nine-tenths of mile grading and draining and construction of bridge and approaches over south fork of Elkhorn Creek for $25,-736; **R. F. Pryor & Co.** of Mayfield, 5.1

miles grading and draining for $33,442; **Codell Construction Co.**, 5.2 miles grading and draining for $32,000; **Corum Brothers** of Madisonville, 5.1 miles surfacing for $33,747; **Gay-Coleman Construction Company** of Ashland, 1.4 miles surfacing for $35,045; **H. H. Miller Construction Co.** of Jackson, 2.2 miles grading and draining for $20,562; **Ralph E. Mills & Co., Inc.**, 2.9 miles grading and draining for $37,622; **T. J. Atkins & Co.** of New Albany, Ind. 10.5 miles surfacing for $44,778, also 12.8 miles surfacing for $62,805; **Southeastern Construction Company** of Eminence, two-tenths of a mile grading and drainage for $13,183; **H. F. Mathis** of Bardstown, 2.4 miles surfacing for $12,739; **Corum Brothers** of Madisonville, 2.8 miles surfacing for $12,179; **N. E. Stone Construction Company** of Madisonville, 10 miles concrete surfacing for $182,935; **Georgetown Construction Company**, 2.8 miles grading and draining for $19,368 and **Clark, Stewart & Wood** of Lexington, repair of bridge across Herrington Lake on the Burgin-Buena Vista Road for $3,912.

William D. Vogel of Indianapolis was low on 15,000 lineal feet of bank revetment on the Ohio River about three miles above Evansville for $303,426. Also on the 13,000 lineal feet of revetment on six miles below Evansville at $236,340.

At the $651,464 letting October 25th the Kentucky State Highway Commission awarded: to **Southeastern Construction Company** of Eminence, 3.4 miles of grading for $19,968; to **Ross Construction Company** of Columbus, Ohio, 3.8 miles of grading for $42,873; to **J. F. Mulligan, Incorporated**, of East View, 4.5 miles grading for $20,639; to **Myers & Gorman** of Flemingsburg, bridge and approaches over Bacon Creek for $41,866; to **Ralph E. Mills & Company, Incorporated**, of Frankfort, 2 miles of grading for $10,342; to **John F. Esterkamp** of Covington, 5.8 miles of surfacing for $105,286; to **Codell Construction Company** of Winchester, 6.5 miles of grading for $90,462; to **Campbell-Johnson Company** of Pikeville, 10.2 miles of surfacing for $68,999; to **Holmes Construction Company** of Wooster, Ohio, 9 miles of concrete at $200,848; **Andrews Asphalt Paving Company** of Hamilton, Ohio, 2.19 miles of concrete for $50,378.

Tennessee Notes

Minneapolis Dredging Company of Minneapolis was low for dredging 3,286,000 cubic yards in the Wolf River at $506,044.

Preliminary survey for the construction of the General Joe Wheeler Dam has been completed by the Tennessee Valley Authority. Wilfred M. Hall of New York has been appointed engineer in charge of construction and Lee H. Huntley, also of New York, has been appointed construction superintendent.

W. W. Boxley & Co., of Roanoke, Virginia, received the award at $256,223 for construction of the heavy-duty reinforced-concrete highway of Coal Creek to the west abutment of the Norris Dam.

Preliminary studies of the site of dam number three on the Tennessee River, which is to be the first above the Wilson Dam at Muscle Shoals, seem to indicate a 50-foot height and a crest length of 6,000 feet. Such a dam would create a lake having an area of nearly 100 square miles and with the slack water extending upstream about 88 miles. The project and its plans are being reviewed by J. L. Savage, who will design the structure.

River Notes

Of the $44,000,000 alloted for work on Mississippi River flood control $13,600,000 had been awarded up to November 2nd and to that day there had been advertised but not awarded an additional $3,475,000 worth of projects. This leaves $26,925,000 for new work to be bid.

During September, **contractors placed 14,312,546 cubic yards** in the flood control work on the Mississippi and its tributaries. In addition 4,547,101 cubic yards was removed from channels by dredging.

Major T. B. Larkin, who has for 5 years given splendid service to the U. S. Engineers in charge of the Vicksburg District has been assigned to the new U. S. Engineers' District in Montana where he will have charge of the Fort Peck dam and reservoir at the headwaters of the Missouri River. Ma-

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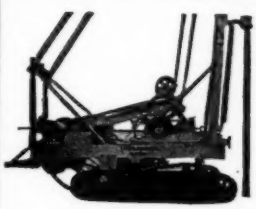

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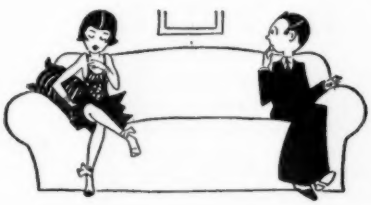

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Shots From the Firing Line—*Continued*

jor Larkin will be succeeded as district engineer by Major Clark Kittrell, who has been his popular and efficient assistant for two years.

Minnesota District

The U. S. Engineers' Office at St. Paul will receive bids until December 8th for construction of Lock No. 5-A near Winona. Bids were received November 28th for Lock No. 8 near Genoa, Wis.

Rock Island District

Low bidder October 24th for Lock 16 on the Mississippi near Muscatine, Iowa was **Central Engineering Company** of Davenport. Their bid was $1,196,978. Unit price on 66,000 yards common 32 cents, 38,660 yards fill 37 cents.

Pennsylvania Drilling Company of Pittsburgh was low on the test boring bidding of October 17th. They bid $2.15 per foot on 725 lineal feet in overburden on Lock 10.

Unit Core Drilling Company of Huntington, W. Virginia, bid $2.20 per foot for the low on 513 feet at Lock 18.

The Rock Island Office of the U. S. Engineers, which received bids November 28th for Lock No. 18 above Burlington, Iowa, will take bids December 5th for Lock No. 22 at Saverton, Missouri, December 12th for Lock No. 11 at Dubuque, Iowa, December 19th for Lock No. 12 at Bellevue, Iowa, December 27th for Lock No. 18 at Guttenburg, Iowa and January 13th for Lock No. 14 at LeClaire, Iowa. Each of these locks is estimated to cost $1,420,000.

St. Louis District

By A. J. KOENIG

Low bidders for eight Missouri River dike and revetment jobs at the letting November 8th were: **Woods Brothers Construction Company,** 4,200 lineal feet of pile dikes at Pelican Bend; 2,000 lineal feet of revetment on the lower Pelican Bend; 3,800 lineal feet of pile dikes on the St. Charles Bend; 6,000 lineal feet of pile dikes on the St. Charles Reach; and 3,000 lineal feet of revetment on the Bonhomme Bend. **Patton-Tully Transportation Company** of Memphis 3,700 lineal feet of pile dikes at Amazon Bend; 7,800 lineal feet of pile dikes on the Bellefontaine Reach. **W. P. McGeorge** of Pine Bluff, Arkansas 3,000 lineal feet of pile dikes and 3,000 lineal feet of revetment at Springhouse and Howard Bends.

U. S. Engineers will receive bids in the near future for the construction of the Alton lock and dam.

Low bidders for dike and revetment jobs offered October 23rd and 24th were: Massman Construction Company, Kansas City, $100,720 for 3,500 feet of pile dikes at Augusta Bend, also $125,275 for 2,500 feet of pile dikes and 3,200 feet of revetment at Weldon Springs Reach and $126,400 for 3,800 feet of pile dikes at St. Charles Bend; **Woods Brothers Construction Company,** Lincoln, Nebraska $172,110 for 4,300 feet of pile dikes and 2,500 feet of revetment at New Haven Reach, also $77,100 for 3,000 feet of revetment at Bonhomme Bend; **W. P. McGeorge** of Pine Bluff, Arkansas $162,380 for 3,800 feet of pile dikes and 3,000 feet of revetment at Springhouse Bend; **Chernus Construction Company,** Jefferson City, Missouri, $195,000 for 6,000 feet of pile dikes at St. Charles Reach; **Patton-Tully Transportation Company,** Memphis $92,350 for 3,700 feet of pile dikes at Amazon Bend; **Colnon Construction Company,** St. Louis $244,975 for 7,800 feet of pile dikes at Bellefontaine Reach Fruin; **Kansas City Bridge Company,** Kansas City, $128,800 for 4,200 feet of pile dikes, at Pelican Bend; also $50,860 for 2,000 feet of revetment at Lower Pelican Bend; **W. A. Wogan,** Kansas City $151,990 for 5,400 feet of pile dikes and 1,000 feet of revetment at Washington Reach.

The low bids for two dike and revetment jobs let October 6th were: **Union Bridge & Construction Company,** Kansas City, for 3,000 linear feet of revetment at Whittenberg, Missouri, $67,850; **Patton-Tulley Transportation Company** of Memphis, $42,320 for 2,000 linear feet of pile dikes at Rockwood, Illinois.

Louisville District

Badgett Construction Company, Memphis were low October 24th on the stone dike in the Ohio River at Uniontown, Kentucky with a bid of $63,950.

Wm. D. Vogel Company of Indianapolis was low at $539,776 on construction of 15,000 linear feet of revetment on the left bank of the Ohio River and 13,000 feet of revetment on the right bank of the Ohio at Evansville, Indiana.

Kansas City District

Addison-Miller, Incorporated of St. Paul bid in 4,935 linear feet of pile dikes in the Missouri River at Atchison and Bean Lake Bends for $157,359 at bidding of October 12th.

Low bidders on dike and revetment jobs the letting of the 25th, 26th and 27th included: **Massman Construction Company** of Kansas City, 13,250 feet of pile dikes at $432,300 also 5,800 feet of pile dikes for $213,975 and 9,070 feet of pile dikes for $340,325; **Addison Miller, Inc.** of St. Paul, Minnesota; 7,120 feet of pile dikes for $256,034; **Union Bridge and Construction Co.,** Kansas City, 7,050 feet of pile dikes for $221,781; **Woods Bros. Construction Company** of Lincoln, Nebraska, 4,210 feet of pile dikes for $129,556 also 4,895 feet of pile dikes and 2,200 feet of revetment for $183,578; **Kansas City Bridge Co.,** Kansas City, 8,300 feet of pile dikes and 1,100 feet of revetment for $204,151.

Memphis District

Minneapolis Dredging Company, Minneapolis, received award for dredging approximately 3,000,000 cubic yards of material from Wolf River at Memphis. The protest filed by Wilbanks & Pierce, Incorporated, New Orleans, Louisiana against this award was dismissed.

Burns Norris, Black Rock, Arkansas, bid 35 cents per yard, against the U. S. estimate of $1.74 per yard, for constructing 2,200 cubic yards of earthwork at Pecan Point, Arkansas.

T. L. James & Company and **Guilliams Brothers** of Ruston, Louisiana, were low bidders at 21.35 cents on three items totaling 592,000 yards located near Mound City, Illinois. Government estimates on the three items were 37.12, 33.51 and 23.69 cents per yard. Seventeen contractors submitted bids.

The contingent bids as reported in our November issue at the Memphis letting October 6th were thrown out and the Government awards were issued as follows: U. S. Engineers, Caruthersville, Missouri and Armorel, Arkansas levees totaling 1,828,000 yards at 16.59 cents; **Driver Construction Company** of Memphis, Long Lake, Arkansas, levee of 630,000 yards at 18 cents and three Oldtown, Arkansas levee sections totaling 2,213,000 cubic yards at 23.4 cents; **Matthews Brothers** of Erie, Illinois, the Butler, Arkansas, levee of 583,000 yards at 19.7 cents; **C. J. List Construction Company,** Kansas City the Bledsoe, Arkansas, levees totaling 626,000 yards at 30 cents; **C. C. Aderholt,** Clarksdale, Mississippi, Moon Lake and Friars Point, Mississippi, levees totaling 2,095,000 yards at 19.91 cents; **Yale & Reagan** with **Benson & Kaiser** of St. Louis one section of the Williamson, Arkansas, levee totaling 630,000 yards at 26.85 cents; **R. T. Clark and associates** of Natchez, Mississippi two Williamson, Arkansas, levees totaling 2,563,000 yards at 25.47 cents and 26.74 cents; **J. T. Pollard** of Wilson, Arkansas, one section of the Oldtown, Arkansas, levee of 1,310,000 yards at 24.7 cents; **Lewis-Chambers Construction Company** of New Orleans, two sections at Snow Lake and two at Laconia, Arkansas, totaling 2,966,000 yards at 24.47 cents.

Low bidders for rental of draglines and trucks for use in levee repairs in Arkansas and Mississippi on October 11th were: B. E. Bunnell, Cape Girardeau, Missouri; Edward H. Polk, Helena, Montana; R. B. Potashnick, Cape Girardeau, Missouri; Gerald Smith Construction Company of Memphis and Delta Construction Company of Lake Cormorant. No awards were made on six other dragline and truck combination jobs.

Patton-Tulley Transportation Company, Memphis, only bidders, took 2,000 linear feet of pile dikes at the head of Island 21 and 1400 feet of pile dikes at Cottonwood Point for $149,654 on October 23rd.

W. W. Keaton, Clarendon, Arkansas submitted low bid October 24th on 18,000 cubic yards of earthwork in the Village Creek district at 24 cents.

Chernus Construction Company of Jefferson City submitted the only bid October 10th for constructing 26,700 cubic yards on the Birds Point-New

Madrid Floodway levee. Their bid was $1.25 per cubic yard.

B. E. Bunnell of Cape Girardeau were low at 33 per cubic yard for 18,000 cubic yards of earthwork in Drainage District No. 25, Dunklin County, Missouri.

Marion Contracting Company of Marion, Illinois, was low October 30th on construction of 30,000 cubic yards of earthwork and rip-rap pavement at Shawneetown, Illinois. Their bid was 45 cents.

Joe I. Hays, Jackson, Tennessee was low bidder on the concrete tetrahedral blocks. His price was 11¾ cents per block for 1,500,000 blocks to be used in bank protection at Island 40, Vice President Island and in Wolf River.

Vicksburg District

Low bidders November 7th on bank protection work were: **Nelson Brothers and Strauder** of Baton Rouge, 4000 lineal feet at LaGrange Towhead at $840,400 including 275,000 yards of grading at 55 cents; and **Badgett Construction Company** of Memphis, 2,100 feet on Upper American Bend including 63,600 yards grading at 28 cents and totaling $214,700 for all items.

New Orleans District

Dameron & Kenyon, Port Allen, Louisiana were low at 26½ cents on 550,000 cubic yards of earthwork on the Petite-Krotz Spring levee at the bidding October 23rd.

Nelson Brothers of Baton Rouge bid 72 cents for 275,000 yards on item L842 A, B and C at Baton Rouge. The bid was made contingent on use of an alternative method of construction to be approved by the Y. & M. V. Railroad. The method has been approved by the railroad officials and Nelson Brothers were recommended by the U. S. Engineers for the contract. Gifford Hill Company Incorporated of Dallas protested the award as their bid of $1.164 on item B with the Robinson & Young bid of 53 cents on items A and C would have secured the award had the Nelson bid been rejected.

At the 6,430,000-yard bidding October 10th, the following were low bidders: **Providence Construction Company** of Lake Providence, Louisiana, 3,625,000 yards on the Lake St. John-Sycamore levee at 24.47 cents; **R. T. Clark Co. with Delta Construction Co., J. W. Noble and Morrisey Construction Company**, Natchez, Mississippi, 645,000 yards on the Lake St. John-Sycamore levee at 31.85 cents; **Valley Construction Company** of Vidalia, Louisiana; 765,000 yards on the Lucerne-Forest levee at 25.4 cents; **Acme Construction Company**, Point a la Hache, Louisiana, 85,000 yards on the Belair levee at 24 cents; **C. E. Walker**, Port Allen, Louisiana, 55,000 yards on the Sunrise levee at 38 cents; **Sternberg Company**, St. Louis, 575,000 yards on the Union, Stella and Point Houmas levees at 20.4 cents; **John L. McWilliams**, New Orleans, 210,000 yards on the Chariot levee at 24.24 cents; **Highways Construction Company**, New Orleans 130,000 yards on the Lower Bowden levee at 30.87 cents. Bids were rejected on the Bennet Carre Point levee and no decision was made on three sections of the Baton Rouge levee.

Low bidders at the October 30th letting were: **J. W. Noble of Fayette, Mississippi** for 260,000 yards in the Taconey and Vidalia Emergency levees at 22.93 and 23.96 cents; **Gifford-Hill, Incorporated**, Dallas, 65,000 yards at Bonnet Carre Point at 19.98 cents; and **J. H. Boyce and Roy L. Igo** of Baton Rouge, 560,000 yards at Krotz Springs at 45 cents. The latter bid was 12.68 cents over the government estimate and recommendation was made against this award.

McWilliams Dredging Company of New Orleans, La., secured 2,500 cubic yards of earthwork on the Cyremort Crevasse levee at $1.95 per yard.

A. N. Goldberg, Inc., secured 11,000 cubic yards in the Little Bayou Gap and 21,000 cubic yards in the Mill Bayou Gap at 27 cents.

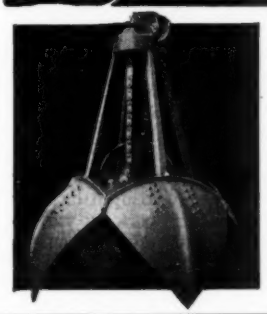
Gifford-Hill and Company of Dallas were low on 145,000 yards in the Pontchartrain District at 24.8 cents per yard. Their bid totaled 35,960.

Arkansas Notes

By ERNEST W. FAIR

The Vincennes Bridge Company of Vincennes, Indiana, has been awarded contracts to build 3,445 feet of steel

Hayward Buckets



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Shots From the Firing Line—*Continued*

and concrete bridges over the St. Francis river and drainage ditches on the Lake-City-Monette road, highway No. 12, Craighead county with a bid of $178,835.

The Dalton Construction Company has completed a short highway job near Brinkley. They have also completed a six mile stretch in the Cache river bottoms between Dagmar and Brasfield on Highway No. 70.

FLORENCE J. DONAHUE

Florence J. Donahue, 56, inspector of asphalt paving for the Arkansas state highway department, was killed instantly about 4 o'clock on the afternoon of October 28th when a coupe he was driving collided with another car at Hot Springs. He was well known as a successful contractor and road engineer throughout the southwest. He was born in Providence, R. I., moved to Little Rock in 1890. Soon after his arrival he engaged in the contracting business there.

ROBERT E. GANDY, JR.

Robert E. Gandy, Jr., 30, of the Smith Construction Company of Lake Village, died there October 28th. He was a native of Barlow, Florida.

William L. Peterson of Little Rock is constructing units of the Army-Navy General hospital at Hot Springs.

Plans for the **prequalification of contractors** working on projects in Arkansas have been outlined by the Arkansas General Contractors' Association in a recent meeting at Little Rock. A. B. Pickett of Little Rock, vice-president, presided and led the discussion. Three committees were named. The road and bridge committee includes D. B. Till, chairman; D. H. Daugherty and D. F. Jones, all of Little Rock; sewers and waterworks—George J. Robinson of Pine Bluff, chairman; G. C. McEachin and W. F. Moody, both of Little Rock; general contractors committee headed by J. H. Hewitt of Little Rock as Chairman, R. T. Higgins of Hot Springs and George H. Burden of Little Rock, members. Mr. Pickett was elected president succeeding the late L. L. McEachin and Mr. Daugherty was elected vice-president.

The Garrett Construction Company of Springfield, Mo., has completed road work on highway 62 south from Leslie to Damascus.

Mississippi Notes

By ERNEST W. FAIR

A system of **"prequalification" for highway contractors**, insuring against interruption of projects through financial involvement has been instituted by the Mississippi State Highway Commission. E. D. Kenna, highway director, explained the system called for filing by contractors of financial statements, schedules of equipment and history of their construction service. On the basis of these statements the commission will rate the contracting firms and determine their eligibility for projects in various classifications.

A. P. Johnston and W. A. Davis of Magnolia have completed highway work on U. S. Highway 51, Lincoln county.

Cobb Brothers Construction Company of Meridian have completed highway work on U. S. Highway 80 in Newton county.

Martin Wunderlich of Jefferson City, Mo. is doing approximately nine miles of highway work on the Mississippi Highway 7 in Lafayette county. He has completed similar work on highway 6 in the same county. He is also nearing completion of over ten miles of highway work on U. S. Highway 49 in Stone and Harrison counties.

Louisiana Notes

By ERNEST W. FAIR

The Forcum-James Company of Dyersburg, Tenn., has been awarded the contract for construction of bridges over Bayou Nexpique and Dry Slough on the Basile-Elton Highway in Acadia and Jefferson Davis parishes. Work has already begun.

Cochran and Moore of Shreveport are completing highway work on the Columbia-Grayson road.

Ben F. Flynn of Alexandria has completed construction on the highway between Sterlington and the intersection of Highway Routes 11 and 200.

The Bisso Towing Company of New Orleans has begun work on dredging the Gulfport basin to a uniform depth of 27 feet. Work was started on the west side and the sand pumped from the basin deposited there as a fill for the concrete pier and warehouse which the municipality proposes to build.

Oklahoma Notes

By ERNEST W. FAIR

M. A. Swatek and Company of Oklahoma City are doing road work in Oklahoma City, on NW 23rd street.

The Standard Paving Company of Tulsa has finished road and bridge work on State Highway 19 over Muddy Boggy, between Antlers and Atoka.

T. C. Ottinger of Hinton has finished road and drainage work on state highway 33 from south of Crescent to the Kingfisher County line.

J. W. Hooper of Oklahoma City is building two bridges on the above named project.

Moran and Buckner of Muskogee, with a bid of $154,642 were awarded the contract for road work on U. S. Highway 62, north and south of Boynton.

J. E. Smith and Sons of Noble have finished highway work on State Highway 19 at Maysville. The Boardman Company of Oklahoma City has also completed a bridge near the city.

G. E. Keck of Fairview has completed six miles of grading, drainage and bridge work on State Highway 34 between Buffalo and Supply.

The Public Works Administration at Washington has given its approval to the projected **Wolf Creek Dam**, estimated to cost $758,000.

When writing to Bucyrus-Erie Company, please use coupon or card bound in this issue.

JAKE KIERDOFF

Jake Kierdoff, 67, pioneer McAlester contractor, died at his home there October 11th, leaving a wife and five grown children.

ORLANDO M. FORCADE

Orlando M. Forcade, 76, retired Oklahoma City excavating contractor, died at the home of his daughter in Oklahoma City. He moved to Oklahoma from Nebraska in 1892 settling on a farm near Norman. Nine years later he moved to Oklahoma City and started the contracting firm from which he retired 15 years ago. Included in the excavation projects he directed were Belle Isle Lake at Oklahoma City and the Oklahoma Publishing Company building. He also excavated for much of the railroad trackage in and about Oklahoma City.

Firms having won contracts for construction work in connection with C. C. C. activities in Oklahoma are as follows: at Sulphur, the Bellows Construction Company of Oklahoma City; at Wilburton, J. W. Martin of Wilburton; at Keystone, Floyd McCrarey of Tulsa; at McAlester, Bellows Construction Company of Oklahoma City; at Mountain Fork, T. J. Ryan of Mena, Ark.; at Binger, the Manhattan Construction Co. of Muskogee; at Talihina, O. C. Buschow of Heavener; at Turner Falls, the Bellows Construction Co. of Oklahoma City; at Weowoka, and Rush Springs, the Bellows Construction Co.; at Buffalo Springs, Manhattan Construction Co.; at Battiest and Eagletown, T. J. Ryan of Mena, Ark. and at Tecumseh, H. W. Thompson of Stillwater.

C. S. Constant Co. of Dallas is building .78 miles of grading, drainage and road work and four bridges on State Highway 5, east of Walters.

M. E. Gillioz of Monnet, Missouri is building a bridge on U. S. Highway 64 over Anderson Creek, east of Camp Houston in Woods county.

The Hyde Construction Company of Enid is building a new bridge on highway 64, across Bib Sallisaw creek, 4 miles west of Sallisaw.

Ryan-Richards of Oklahoma City are doing three miles of highway construction work on U. S. highway 62 east from Altus in Jackson county.

The C. S. Clark Construction Company is building highway in Kiowa county on U. S. highway 62.

Texas Notes

By ERNEST W. FAIR

Members of the **Trinity River Canal Association** recently held their annual banquet at Fort Worth. They are urging the project bearing their name and have been working many months toward its realization.

The Briggs-Darby Construction Company of Pharr has begun road, sidewalk and similar work at Fort Sam Houston. The job was bid for $186,750.

Word has been received that a bridge across the Trinity River at Ennis has been approved by the War Department at Washington. Present navigation of the river consists of skiffs and small launches.

The Carter-Humphries Co. of Dallas has completed the sewage disposal plant and system job at Tyler.

The Lone Star Construction Company of San Antonio is working on highway 27 west of Kerrville, on a six-mile stretch.

Thomas and Ratliff Construction Company are building a bridge on the Longview-Kilgore highway over the Sabine River. **Perry McGlone** had the contract for preparatory work.

The Sternberg Dredging Company of St. Louis was the only bidder for dredging 3,520,000 yards from Freeport Harbor. They bid 6.75 cents per cubic yard against the government estimate of 7.13 cents.

Low bidders for recent grading projects include **O. Speer and J. Spencer** of Alvord; **R. B. Stroup** of Vernon; **J. W. Goodman** of Saginaw; **Brown & Root** of Austin; **McKnight Company** of Amarillo and **Hannah & Hall** of Waco.

Contracts have been awarded by the United States Engineer Department to the **Atlantic, Gulf and Pacific Company** for improving certain sections of the Houston Ship Channel. Dredges are now at work in the channel between Bolivar Roads and Morgan Point, a distance of about twenty-five miles, widening from the present width of 250 feet to 400 feet on the bottom and deepening from 30 to 34 feet, with payment for an additional foot if excavated.

The sum of $1,500,000 was allotted from the $70,000,000 river and harbor fund made available by the Emergency Recovery Administration, and an application is now on file for an additional $1,043,000 to complete the **deepening of the channel from the gulf to the Turning Basin**, the total sum of $2,543,000 having been the Government Engineer's estimate of the cost of the entire project which had previously been approved by the Chief of Engineers and the River and Harbor Committee of Congress. Under present plans the entire work will be completed during 1934.

Contract has just been awarded to the **American Construction Company** of Houston for extensive improvements to be placed on Wharf No. 12, amounting to $122,600.

New Mexico Notes

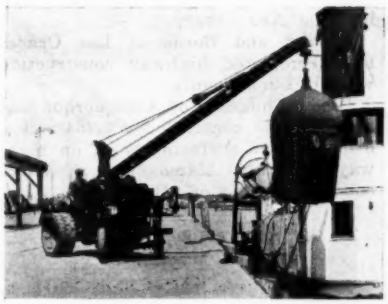
By ERNEST W. FAIR

George N. Neel of Santa Fe has been named public works engineer for New Mexico.

Armstrong and Armstrong are building slightly over four miles of highway, and some overpass construction work on highway 66 near Suwanee in Valencia county.

F. D. Shufflebarger of Albuquerque has completed highway work near Santa Fe.

CUT . . .



handling costs

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This strong, compact, fast-working crane will load and unload trucks and cars, sort and pile stored material; lift rock, pipe and transformers from and into trenches and manholes; serve machine tools; assist in overhauling and repair work.

On many jobs this indispensable unit will and has paid for itself in 60 to 90 days. After that its savings are clear profit.

BUCYRUS-ERIE CO.

South Milwaukee, Wisconsin

Crawler or Wheel Mounted

BUCYRUS ERIE LOADMASTER

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Lee Moor Contracting Company is doing twelve and a half miles of grading, paving and other highway work in Otero county.

A. O. Peabody of Las Cruces has completed ten miles of highway work in Dona Ana county.

Hayner and Borns of Las Cruces have completed highway construction work in Luna County.

Henry Thugeson of Albuquerque was awarded the contract for 2.754 miles, overpass and surfacing work on highway 70 near Alamogordo in Otero county on a bid of $109,565.64.

Arizona Notes

By H. M. BIBAUD

Jubilation reached a high mark in Arizona, November 3rd, when the news of the **granting of the Verde loan for the development of Arizona's central dry area** was proclaimed throughout the state following the granting of $18,913,000 in Washington, D. C. The Federal Emergency Administration of Public Works made an initial allotment of $4,000,000 to begin construction of the 80,000-acre agricultural project in Paradise and Deer Valleys, north of the Salt River project.

Phoenix will benefit largely by the Verde project and the end of the depression in that section is safely prophesied. Thousands of men will be given employment for periods ranging from two months to three years. The 80,000 acres of fertile desert land is described as a section that most nearly approaches a frost-free belt of any in the United States. Work will begin as soon as the government contract is signed, according to Burt H. Clingan, President of the District. The proposed construction includes dams, reservoirs, canals, lateral systems and power development. Plans call for the construction of Camp Verde reservoir on the Verde River with a capacity of 95,000 acre feet and the Horseshoe reservoir on the same stream with a capacity of 240,000 acre feet and the New River reservoir, with a capacity of 83,000 acre feet. The Cave Creek reservoir, previously built near Phoenix, also will be available for storage. Construction of the McDowell-Paradise canal for distributing and fifty pumping plants is included in the plans. Eight power plants are a part of the specifications.

A board of engineers, headed by Porter J. Preston of the reclamation service, W. W. Lane, chairman of the Arizona Public Works Board and Howard S. Reed, Arizona-New Mexico engineer for the Federal Emergency Administration of Public Works, investigated the project and recommended the granting of the loan.

Work has been started on a **new road from Casa Grande to Casa Blanca** in the Prima Indian reservation where a $3,000,000 improvement program has been instituted by the government.

Supervisors of Gila County **discussed plans November 5th for the construction of a road down Pinal Creek**, in order to provide employment. The proposed road will open the northern part of Gila County to the business sections of Globe and Miami. It will eliminate a steep climb over the summit on the present road and will shorten the distance to the Pleasant Valley region by ten miles.

W. A. Rawls of El Paso, Texas, has started work on his $114,735 contract for constructing a five-mile road in the Chiracahua National Monument of Cochise County. The road will climb from Bonita Canyon to the rim of the mesa so that a panoramic view can be obtained.

Pearson and Dickerson of Phoenix submitted the lowest of three bids for the grading and construction of subbase on 6.2 miles on U. S. 66 between Ashfork and Kingman at $119,111.

Montana Notes

Recent contracts awarded by the State Highway Commission include **Mountain States Construction Company** of Billings, 4.585 miles of grading and crushed gravel surfacing at $53,018; **J. C. O'Connor** of Butte, 12.445 miles of grading, crushed gravel surfacing and structures at $180,686; **Tomlinson-Arkwright Company & J. L. McLaughlin**, 7.201 miles grading, surfacing and structures at $91,446; **Earl McNutt** of Eugene, Oregon, 13.091 miles grading, structures and graveling at $118,722; **Poston Brothers** of Kalispell, 13.591 miles grading, surfacing and structures at $101,875; and **S. Birch & Sons Construction Company** of Great Falls at $225,612 for 9.808 miles.

$25,000,000 has been allotted to the Army Engineers for beginning construction on the **$60,000,000 Fort Peck Dam** on the Missouri River in eastern Montana. The location is 11 miles above the mouth of the Milk River near the city of Glasgow. The dam will be an earth fill structure 231 feet high above stream bed and about 12,000 feet long creating a 17,000,000 acre-foot reservoir with a surface area of 332 square miles and a length of 175 miles. A 200,000 cubic-foot-second spillway will be constructed on the left bank of the river and tunnels will be driven to handle river diversion during construction. Provisions will be made for future installation of turbines to develop 532,000 horsepower. The earth fill will require about 72,000,000 yards. The project is intended primarily as an aid to navigation on the Missouri and will also be used for irrigation. Water will be released from the reservoir as required to maintain a reliable 9-foot depth in the navigable channel to Sioux City.

Bids will be opened December 20th for construction of open drains by the Greenfields Division on the **Sun River project.** The work is located near Fairfield, Montana on the Milwaukee, St. Paul and Pacific Railway. Involved are: 840 cubic yards of drain excavation; 2,000 cubic yards of excavation for structures; 32,000 cubic yards of backfill about structures; 300 cubic yards of concrete; placing 17,000 pounds of reinforcement bars; laying 9,000 linear feet of corrugated metal pipe; and erecting 3 M. ft. b.m. of timber in structures. Materials are to be furnished by the Government. For particulars, address the Bureau of Reclamation, Fairfield, Montana; Denver, Colorado; or Washington, D. C.

The Bureau of Reclamation at Fairfield, Montana, will receive bids up to December 20th for open drains in the Greenfields Division on the Sun River project. The work involves 840,000 cubic yards of drain excavation, 2,000 cubic yards of excavation for structures, 32,000 yards for backfill and other items.

Wyoming Notes

Lawlor & Woodward of Seattle were awarded contract of 1,350 feet of diversion tunnel 20 feet in diameter (inside the concrete lining) together with inlet and outlet structures and partial construction of the gate tower for the Alcova Dam. The amount of their bid was $269,905.

Nevada Notes

At the October 25th bidding at Carson City the following awards were made: **George French, Jr.**, of Stockton, California, state highway in Humboldt County for $94,574; **Gibbons and Reed Company**, Salt Lake City, state highway in Clark County for $130,086; **Utah Construction Company** of Ogden, Utah, state highway in White Pine and Elko Counties for $138,084.

Washington Notes

The Spokane Office of the Bureau of Reclamation received bids November 20th for **excavation of overburden at the Grand Coulee damsite** on the Columbia River. This work is located 20 miles northwest of Almira, Washington, and involves 2,000,000 cubic yards of common excavation and 40,000 cubic yards of rock excavation.

Oregon Notes

J. A. Terteling & Sons of Boise, Idaho were low at $492,075 for earthwork, concrete lining and structures on the North Canal from station 513 to station 2051 and the Mitchell Butte Lateral on the Owyhee project.

General Construction Company of Seattle were awarded dredging for the Boonville Dam on the Columbia River on their bid of $668,500.

At the bidding of the Oregon State Highway Commission November 15th **J. W. & J. R. Hillstrom** of Marshfield were awarded .59 miles of grading and surfacing of the Sixes River Section of the Cape Blanco Secondary Highway for $10,305; the same contractor secured the bridge over the Williamson River on the Chiloquin Secondary Highway for $13,195; **Joplin and Eldon** of Portland secured contract for the Winston Bridge over the South Umpqua River on the Pacific Highway south of Roseburg for $98,254; **F. H. May** of Bend secured the bridge over Rock Creek and six trestles on the six mile canyon section of the Wasco-Heppner Secondary Highway near Con-

don on their bid of $16,774; **United Contracting Company** of Portland were awarded 6.4 miles of widening and resurfacing asphaltic concrete pavement with .9 mile of bituminous macadam wearing surface on the Albany-Tangent section of the Pacific Highway for $69,699; **S. H. Newell & Company** of Portland were awarded 14 miles of grading and surfacing of the Jackson Creek-McDermitt section of the I.Q.N. Highway for $32,550; **O. N. Pierce** with **M. L. O'Neil & Son** of Portland bid 19,256 to secure the bridge over the Owyhee River on the Jordan Valley secondary highway near Nyssa; **L. O. Herrold** of Salem bid in the pavement widening and resurfacing on the North Salem section of the Pacific Highway at $44,841; **Saxton & Looney** of Corvallis secured the Hardman-Rock Creek Section of the Heppner-Spray Secondary Highway consisting of 3.1 miles of grading for $34,533; **Jacobsen-Jensen Co.** of Portland was awarded 5,000 lineal feet of concrete curbs and 14,000 square yards of concrete pavement on 82nd Avenue to East City Limits section of the Base Line Highway for $34,330.

San Francisco and Vicinity

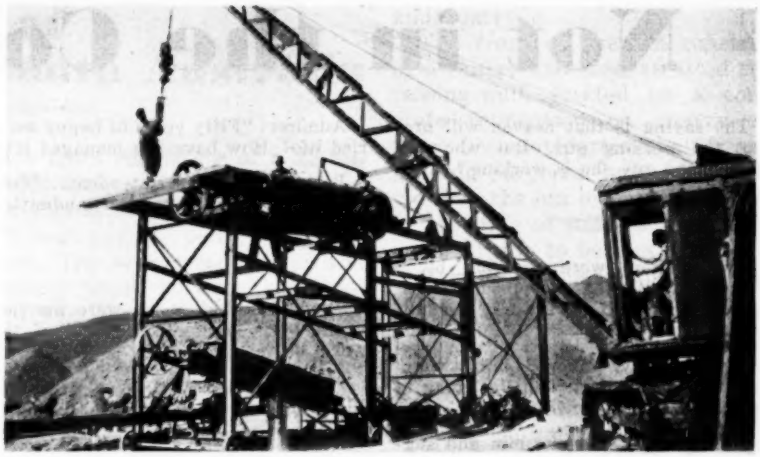
By H. L. LIVINGSTON

Young & Son Co., Berkeley, California have been awarded a contract for 3.7 miles of grading in Yolo County. The amount of the contract was $140,708. and involves 249,000 cu. yds. of excavation.

An initial allotment of $4,000,000. to begin construction on the **Verde Irrigation & Power Project** in Arizona has been made by the Public Works Administration. This work will involve three reservoirs, several dams and canals. The total estimated cost of the project is $18,912,000.

Daniel Contracting Company of San Francisco was awarded contract for furnishing 30,000 tons of rip rap for the Sacramento River at $1.60 per ton.

Frederickson & Watson Construction Co. of Oakland, California, who bid $62,634 for 4.2 miles of grading and crushed gravel surfacing in Calaveras County, was awarded this contract by the California Division of Highways.



Some 20 miles out of Yerington, Nevada, W. S. Souders and his son, Claude Souders, are developing a **placer gold mine known as the S. & S. Mining Company.** The material for this mine is being dug by a Bucyrus-Erie 20-B Diesel Dragline. The washing plant for this mine was set up by the 20-B machine which was used as a crane for this purpose. This mine has just begun active operations and according to engineers' reports should be a good gold-producer.

The Ontario Gold Mining Company have just opened up a new placer mine at Goloconda, Nevada. Bucyrus-Erie erector, Al Johnson, has just left this job after installing a new Bucyrus-Erie Gas+Air shovel.

The Bureau of Public Roads, San Francisco, have a **program of road construction** in various northern California counties amounting to $847,000. This amount of money will be expended on seven different projects. However, due to weather conditions, bids on this work can not be received until early in the spring of 1934.

M. J. Bevanda, Stockton, California, has been awarded a contract by the California Division of Highways for 1.9 miles of grading and concrete paving between San Luis Obispo and Pismo Beach. Amount of this contract was $72,591.

Basich Bros. of Torrence, California, who bid $213,461, have been awarded contract by the California Division of Highways for 2.7 miles of grading and concrete paving in Santa Clara County.

N. M. Ball, Berkeley, California, has been awarded contract in the amount of $106,500. by the Construction Quartermaster of the U. S. Government for concrete paved aprons and drainage work at the Hamilton Field Bombing Base in Marin County.

Geo. Pollock Co., Sacramento, California, was awarded contract by the Nevada State Highway Commission for 22.28 miles of grading and surfacing in Mineral and Esmeralda Counties, Nevada. This contract involves 249,500 cu. yds. of excavation.

The Granite Construction Co., Watsonville, California, was awarded contract in the amount of $71,482 by the U. S. Bureau of Public Roads for placing crushed rock on section A-1 of the Wawona Glacier Point road in the Yosemite National Park.

Mercer-Fraser Co., Eureka, California, who bid $101,939 for 1.9 miles of grading and screened gravel surfacing between Jordan Creek and the South Scotia Bridge, has been awarded this contract by the California Division of Highways.

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For Sale and Bargain Counter sections
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Appearing in any trade paper in the field

Ebonite **Brake Lining, Brake Blocks and Clutch Facings . . .**
. . . cut operating costs on shovels, cranes, draglines, hoists, tractors and trucks . . . multiply operating hours between re-lines . . . cut time losses for brake adjustments
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HELP OF ALL KINDS FURNISHED FREE

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Not in the Contract

The saying is that heaven will protect the working girl. But who will protect the guy she is working?

Two waiters were standing by a table on which the shovel superintendent, after a hard day's work, had fallen asleep.

"I've already wakened him twice," said the first waiter, "and I'm going to wake him a third time."

"Why don't you wake him and suggest he leave?" asked the other.

The first waiter shook his head artfully. "Nothing doing," he whispered. "Every time I wake him up he pays his bill."

"My wife always gets historical when I stay out late at night."

"Hysterical, you mean."

"No, historical. She digs up all my past."

Suspicious Character—Wot am I supposed to 'ave stolen?

Police—A 'orse and van.

Suspicious Character — All right, search me!

Mother: "What did your father say when he saw his broken pipe?"

Operator's Son: "Shall I leave out the swear words, Mother?"

Mother: "Certainly, my dear."

Operator's Son: "Oh, he didn't say anything."

She: "Did you tell your father we were engaged?"

He: "Yes; over the 'phone."

She: "What did he reply?"

He: "I'm not sure whether he replied or whether the line was struck by lightning."

Friend: "What did you do when you found out your husband was leading a double life?"

Wife: "Oh, I redoubled."

Admirer: "Fifty years of happy married life! How have you managed it?"

Retired Mine Superintendent: "Well, for one thing, son, I've always admitted I was wrong."

"Boo, hoo—before we were married you said you'd go to the end of the world on my account."

"Yes, and the way I feel I believe I'll do it!"

Young Man—I should like to ask your advice, sir, as to whether you think your daughter would make me a suitable wife.

Lawyer—No, I don't think she would. Ten dollars, please.

Boy—My, but it'll be great when I grow up and can do just as I please.

Dad—Yes, but then you'll probably get married.

Agent—Is the boss in?

Proud Father—Yes, he's asleep upstairs in his crib.

Little Jimmie — Say, Mother, how much am I worth?

Mother—Why you're worth a million dollars to me, Jimmie.

Little Jimmie — Can't you advance me a dime on it, Mother?

Teacher: Willie, give a definition of home.

Willie: Home is where part of the family waits until the others are through with the car.

Shovel Runner (to man who has just landed from a three-story fall)—Why did you jump out of that window?

Much-Shaken-Up Man — A woman lied to me.

Shovel Runner: That's no reason for jumping out of a third-story window. What did she lie about?

Much-Shaken-Up Man—She told me her husband was in San Francisco.

A metropolitan contractor's son, in the country for the first time, saw a cow being milked.

"Now you know where the milk comes from, don't you?" he was asked.

"Sure," he replied. "You give the cow some breakfast food and water and then drain the crankcase."

"Before we were married, Henry," said the contractor's wife reproachfully, "you always gave me the most beautiful Christmas presents. Do you remember?"

"Sure," said Henry cheerfully, "but my dear, did you ever hear of a fisherman giving bait to a fish after he had caught it?"

"Dearest," sighed the young man, "couldn't you learn to love me?"

"I might," said the girl," I learned to eat spinach."

The Bargain of the Year

ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including shovel, camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

54 Steel bunks with mattresses and bedding. Mattresses and bedding are sewed up in burlap.
6 Heating stoves.
50 Shovels and picks, approximate.
5 Wagons and boxes. Light wagons about 2¾ axles.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
2 Fairbanks Morse gasoline engine and 3x5 bulldozer pump 1½ HP.
4 Track jacks, 15 ton.
3 Track jacks light.
1 Duplex Pump—Worthington, 5¼x 3-½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
2 Wheelbarrows.
2 Each, scythes, hand saws, cant hooks, spike malls.
1 Carbide light.
1 Kitchen outfit.
1 Set boiler tubes for steam shovel.
30 Western dump cars, 5-yard.
2 Davenport locomotives, No. 2039 and No. 2040, weight about 20 tons.
1 36x84" vertical boiler.
1 6" centrifugal pump with upright engine attached.
2 Galvanized water tanks, wagon size.
100 Timbers, 10x12x16'.
12 Timbers 10x12x32'.
1 Chevrolet touring car, 1924 model.
1 Ford 1-ton truck.
1 Best Caterpillar tractor (30).
About 800 pieces of pipe, size 1½ and 2", random lengths.

Will consider individual sale of separate items.

Address Box 449 ME.

EXCAVATING ENGINEER

So. Milwaukee, Wis.

Mining Ironstone at Iron Knob, South Australia

(Continued from page 493)

Loading with Bucyrus-Erie 120-B Electrics

The loading of the ore is carried out by Bucyrus-Erie electric shovels of four-cubic-yard dipper capacity, which have an average loading rate of 400 tons per hour, and which place the ore into side-tipping steel cars of 30-tons nominal capacity. These cars were locally built and were redesigned from data secured by the writer

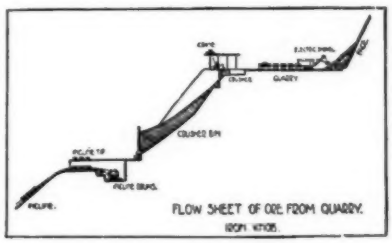

Fig. 3

at the Kiirunavaara mine in Swedish Lapland. They are very heavily constructed of steel and adequately sprung to withstand the severe shocks resulting from the sudden dumping of 6 to 10-ton dipper loads from a height of 4 to 6 feet. At the crusher, the overhead crane hook engages with a wire rope, passing around sheaves on the truck, so rigged that, as the crane hook rises, the wire rope first opens the truck door, and, as the hook continues to rise, the truck begins to tip. The whole motion is completely controllable and can be stopped or reversed at any moment. This method of dumping was selected in order to eliminate the need for an apron feeder between truck and crusher opening, it being feared that the great size and weight of the iron-ore rocks, fed to the crusher, would tend to cause delays and high maintenance if passed over a mechanical feeder. The system as applied can be described as completely successful and successive wagons can be dumped as fast as the crusher can get rid of the ore.

Three 600 volt d.c. electric and one petrol electric locomotive supply traction for the quarry trains, each train consisting of a 22-ton locomotive, a dummy truck and six 30-ton ore cars, the average net load per car being 28 (long) tons. The reason for placing the dummy truck between the rake and the locomotive is to avoid damage from large lumps falling from the shovel dipper on to the locomotive ends.

Crushing the Ore

The next step is the primary crushing of the ore. The maximum haulage distance from any position of the quarry face to the primary crusher is 1600 feet. The primary crusher, of double-toggle jaw type, built by Morgardshammer of Sweden, has an entry opening of 84 inches by 60 inches, and is designed to crush 1000 tons per hour through a 10-inch delivery opening. The quarry cars are discharged, one at a time, into the crusher by means of an overhead travelling crane, the hooking and releasing of the cars being automatic, and no other labor being required at the crusher station than the crane driver and the crusher attendant, who greases and cleans the machinery and sweeps the whole plant. The crusher itself is set underground below quarry level, and discharges its product into a storage bin which has been excavated from the solid ore between quarry E and quarry A.

The front of the bin consists of a timber and steel strutted retaining-wall, erected on a concrete foundation on quarry A floor. Two compartments, for ore grading purposes, have been provided in the bin by leaving a pier or partition of solid rock projecting from top to bottom down the center of the bin, and each compartment holds approximately 2000 tons of crushed ore.

Incline carries ore to train-loading bins

Ore is drawn as required from the steel delivery-chutes of this bin into trains of steel hopper-cars on the quarry A level. Each train consists of three 10-ton cars and one 5-ton locomotive, and, as this level is still some 420 feet above the Iron Knob tramway level, it is necessary to haul the ore from this bin to the upper end of a gravity-operated inclined plane. Fig. 3 illustrates diagrammatically the whole scheme of operation from where the ore is picked up by the electric shovels, loaded into 30-ton cars, hauled electrically to the crusher, passed into the storage bins, and transferred to the incline wagons for transit to the plain below.

The incline is of the self-acting double-track type, with separate main ropes and a common tensioning tail-rope to prevent surging and to take up stretch automatically.

There is a 390-foot drop be-

(Concluded on page 528)

Opening a new cut from the crusher end of the bench. The unloading crane may be noticed in the background.

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE Cats—15½' long, 9' wide, 22" Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

AMERICAN 1 CU. YD. GASOLINE SHOVEL. Motor overhauled 1932. Good value. SCD-3.

P&H MODEL 600—40' BOOM CLAMSHELL. Waukesha 75 HP. Engine. New 1929. Dragline and Shovel equipment also available. SCD-4.

ORTON ⅝ YD. GASOLINE SHOVEL. New 1928. Make an offer. SCD-5.

P&H MODEL 600. New 1929. 20' Boom, 14'3" Dipper Handle, 1 cu. yd. Dipper. Waukesha 75 HP. Engine. Dragline and Clam Shell Equipment also available. SCD-7.

BUCYRUS-ERIE MODEL 30-B DIESEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

BAY CITY TRACTOR TYPE—CHAIN CROWD —⅝ YD. SHOVEL. Cat Mounted. McCormick-Deering Power Unit. Excellent condition. SCD-10.

MONIGHAN MODEL 1-W. WALKER — 60' Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

P&H MODEL 600—40' BOOM DRAGLINE. Waukesha 75 HP. Engine. New 1929. Shovel and Clamshell Equipment also available. SCD-14.

BAY CITY TRACTOR TYPE CLAMSHELL. NEW 1928. Excellent condition. Shovel Equipment also available. SCD-15.

BUCYRUS-ERIE SLIGHTLY USED-LOAD-MASTER TRACTOR CRANE—14' Boom—Rubber tired wheels—Rated lifting capacity 4500 lbs. McCormick-Deering Power Unit—New Machine Guarantee. SCD-17

COMPLETE FRONT END EQUIPMENT

Shovel Equipment

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

⅝ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

¾ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE—High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment Complete suitable for Model 1030 or 1035. Rebuilt—New Equipment Guarantee. SE-22

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—26' BOOM—15' DIPPER HANDLE—Rope Crowd Shovel Equipment suitable for Model D-2. Brand New. SE-3.

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Equipment Guarantee. SE-23.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE—Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror". Good mechanical condition. Low Price. SE-24

Clamshell Equipment

40' BOX BOOM CLAMSHELL EQUIPMENT INCLUDING ROPES. Suitable for Model D-2. Brand New. CS-3.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-4.

45' BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-5.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

¾ CU. YD.—36" WIDE SOLID TYPE DIPPER, 21' Boom, and all auxiliary equipment for application to **Model 1030.** Will dig to maximum depth of 18'. DS-3.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock type.—Will fit 30-B Gas or Diesel. Brand New. D-14

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

4 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

1 ¾ CU. YD.—Cast Front Inserted Tooth. Will fit 1030 or 1035. Brand New. D-17

2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD.—Plate Front. Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 1 CU. YD.—Rock type. Will fit D-2 or 31-B. Slightly Used. D-22

1 1¼ CU. YD. INSERTED TOOTH. Will fit GA-2 or GA-3. Slightly Used. D-25.

1 1¼ CU. YD.—Plate front. Will fit E-2, 41B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—PLATE FRONT. Will fit E-2. Brand New. D-27.

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28.

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly Used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C Machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

1 1¾ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 3,800 lbs. DB-7.

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs. DB-6.

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs. DB-8.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Rebuilt. Approximate weight 6,500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 5,400 lbs. DB-10.

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.

Can Also Be Used for Miscellaneous Service.

Vertical Type

9 36"x82½"—26 H.P.—142 lb. Working Pressure. Mass. Std. Will fit Type A. B-1.

4 42"x88"—35 H.P.—144 lb. Working Pressure. Mass. Std. Will fit Type B Shovel. B-2.

1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel. B-3.

1 44½"x88½"—37 H.P.—145 lb. Working Pressure. Canadian Std. Will fit Type B Machine. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Special Wood Burning. Mass. Std. Will fit any B-2 or B-3 Machine. B-7.

2 46½"x88½"—37 H.P.—150 lb. Working Pressure. Mass. Std. Will fit B-2 or B-3 B-8.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3 B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

1 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C B-14.

1 54"x9'7"—70 H.P.—125 lb. Working Pressure. Canadian Std. Will fit Model 50-B Machine. B-15.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

1 54"x18'—127 H.P.—140 lb. Working Pressure. ASME Std. Will fit Model 103-C B-17.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR-GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR—GENERAL ELECTRIC—75 HP., 2200 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

LIGHTING PLANTS

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 32 Volt. New. LP-1.

1 1 KW MOON TURBO STEAM GENERATOR for lighting Plant. 110 Volt. New. LP-2.

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 110 Volt. Used. LP-3.

1 1½ KW MOON TURBO STEAM GENERATOR—110 Volt Light Plant. Slightly Used. LP-5.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves — Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure, A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions:—Height 45"—Length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4 cylinders, 7" bore x 8½" stroke, 75 HP at 600 RPM, 4 cycle, Vertical—valve in head type. Includes radiator, fan and air cleaners. DE-1.

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—6-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Full equipment. Also auxiliary air starting equipment. DE-2.

4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4 cycle, Vertical—valve-in-head type. Includes radiator, fan and air cleaners. DE-5.

3 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 HP. at 650 RPM. DE-6

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 HP at 400 RPM. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 HP at 400 RPM. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 HP at 400 RPM. 100 lb. Pressure. ME-4.

1 "LITTLE TUGGER" INGERSOLL RAND STEAM HOIST ENGINE No. 1-H-5-2½. H.P. ME-5.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Mining Ironstone at Iron Knob, South Australia

(Concluded from page 525)

tween the head of the incline and the top of the train loading-bin into which the incline trucks automatically discharge their ore. The

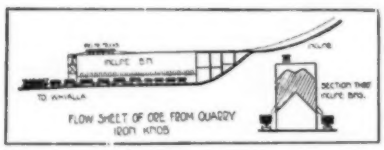

Fig. 4

trucks are of 10-ton capacity bottom-discharging type, and are coupled in rakes of three, the maximum running speed being 35 miles per hour, and the incline's capacity being some 4,000 tons per 8-hour shift.

The tramway storage bin has a capacity of 4,000 tons, and is of steel and concrete, adequately strutted against unbalanced side-pressures. This bin discharges through 72 steel chutes, manually operated, into the main line trains.

Fig. 4 illustrates diagrammatically the lower terminal of the incline, the 4,000-ton storage bin, and the loading position of the main line trains, which, from this point, commence their journey to the coast. In addition to the gravity incline, just described, there are two other inclines which are also used from time to time, with their bins holding 500 and 3,000 tons respectively.

Living conditions at Iron Knob

The company has provided comfortable cottages for its married employees, with adequate water service and electric light. For single men, concrete quarters have been built, with excellent facilities for bathing, and a mess room with kitchen, bakehouse, and all necessary offices. The company has also provided a store, at which clothing, boots, tobacco, and all necessary commodities are obtainable at reasonable rates; and a recreation building, with dance and concert hall, cinema, library reading room, and billiard rooms.

In addition to the acommodation and facilities for which the company is responsible, there is a separate government township with hotel, stores, school, police station, and a few dwellings.

Tipping rakes at the Crusher Quarry "E," Iron Monarch.

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

DRAGLINE-SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U. S. A. Also have 2 years' machine shop experience. Can do own repairing and furnish A-1 references. Present location Florida. Box 5702.

SHOVEL OPERATOR

Ten years' experience on Steam, Gas+Air and Electric Shovels on road and quarry work. Can do own repairing and furnish excellent references. Married. Present location Virginia. Box 6100.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can hand'e crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

SHOVEL OPERATOR

Three years' experience on Bucyrus-Erie Gas +Air on basement excavating, highway and street grading. Also eight years' experience on Erie, Marion, Bucyrus, steam shovels. Will go anywhere in U. S. A. or Canada. Can do own repairing. A-1 reference. Married. Present location Minnesota. Box 5801.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901

OPERATOR

Ten years experience as shovel, clamshell, backdigger and dragline operator on Osgood, Thew, Bucyrus-Erie, Northwest and Bay City machines. A-1 references. Present location New York State. Box 5902

EXPERIENCED DRAGLINE OPERATOR

Fifteen years experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903

OPERATOR

With 26 years experience on Monighan, Bucyrus-Erie and other makes on all kinds of projects. Can do own repair work and furnish good references. Willing to go anywhere. Present location Illinois. Box 5905.

DRAGLINE OPERATOR

25 years experience on steam draglines on construction work. Prefer operating dragline. Can do own repair work. Reliable references furnished. Present location, Indiana. Box 5701.

SHOVEL OPERATOR

5 years experience on Lorain, Northwest, Osgood, and Bucyrus-Erie Gas, Diesel and steam machines. Can do own repair work. Single and willing to go anywhere in U. S. A. or Foreign countries. Can furnish excellent references. Box 5904

SHOVEL OR DRAGLINE OPERATOR

Experienced operator on drainage, stripping, highway and levee construction. Machines from 1 to 8 cubic yard. Last five years on gas machines. Can do own repair work. Best references. Single. Present location Louisiana. Box 5601

SHOVEL CRANE AND DRAGLINE OPERATOR

15 years' experience on gasoline, G+A, Steam and Electric machines. Bucyrus-Erie, Thew and Northwest machines. Prefer operating Bucyrus-Erie. Have worked on highway and railroad grading, quarry excavation. Willing to go anywhere in U. S. A. Can do all repairing and furnish excellent references. Box 5402.

Book Reviews

The Louis Allis Co., Milwaukee, Wisconsin is publishing a special magazine entitled **The Louis Allis Messenger**, devoted entirely to those who are interested in the purchase and maintenance of electric motors. Interesting new motor developments and applications as well as valuable data regarding the care and operation of electric motors will be presented. The magazine contains twenty-four pages, size 8½x11, printed in attractive colors and will be sent gratis to anyone interested in receiving it. When addressing your request to be placed on the mailing list to receive this magazine, please state clearly your occupation.

Alcoa Aluminum for Truck Bodies is the title of a 68-page illustrated catalog published by the **Aluminum Company of America**, Pittsburgh, Pa. It touches but briefly upon the use of aluminum for dump body construction, but will, nevertheless, be of interest to any reader who is considering the design of body for any style of hauling equipment. Tables and diagrams are shown in giving details of construction, and supplementing the bulletin are construction drawings on paper suitable for blueprinting. When writing with regard to this bulletin, please mention **Excavating Engineer.**

The S. G. Taylor Chain Company, Hammond, Indiana announces that they have ready for distribution Bulletin No. 1 containing complete details on iron chain for use in sling, crane, marine and steam shovel work. A copy of this bulletin will be gladly sent to any interested Excavating Engineer reader upon request.

A twelve page circular describing and illustrating **gas electric sets** for every application has been issued recently by the **Westinghouse Electric and Manufacturing Company**, East Pittsburgh, Pa. The publication describes the outstanding features and applications of these sets which range in sizes from 800 watts to 100 kv-a. The sets are applicable wherever auxiliary or standby power is needed and are especially designed for construction and mining operations, and building owners and architects. Copies of this publication C. 1959-A entitled "Gas Electric Sets for Every Application" are available at the nearest district office or direct from the advertising department at East Pittsburgh.

"The remarkable strength of corrugated metal pipe . . . has been explained in theory and demonstrated in fact." Thus ends the Summary contained in the eighty-page, 6 by 9 bulletin published by **American Road Builders' Association** (Bulletin No. 41) entitled **Construction and Use of Corrugated Metal Pipe Culverts.** There are many illustrations, diagrams and tables for the use of the reader.

Trade Notes

The T. L. Smith Company, Milwaukee, makers of concrete mixers and pavers, was recently placed in receivership to be operated entirely separately from its formerly affiliated companies — National Equipment Corporation, Koehring Company, etc. The receiver, Harold E. Smith, was President of the Company from 1916 until 1930.

The American Chain Company and Associate Companies will take over the drawing, fabricating and sale of Allegheny Metal and other Allegheny Alloys in round, flat and shaped wire forms, according to a late announcement. This new wire will be marketed under the name of Page-Allegheny Alloys, and will be sold by the Page Steel and Wire Company of Monessen, Pa. In the plant of the Hazard Wire Rope Company at Wilkes-Barre, Pa., various forms of wire rope will be made from these alloys and at the York, Pa., plant of the American Chain Company chains and chain attachments will be produced. In addition to wire in coils, the Page Steel and Wire Company will fabricate welding wires, traffic guard and other products from Page-Allegheny Alloys.

Chicago Pneumatic Tool Company recently announced the opening of a new branch office at 1028 Sixth Avenue South, Seattle, Wash., A. M. Andresen, Manager. A representative line of the Company's products will be carried in stock, as well as parts for servicing same.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT
FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Osgood 1½ yd. Steam Shovel — Bargain.
- ☐ P & H 600 1-yd. Shovel-Dragline.
- ☐ Industrial—Brown Hoist — 8 Wheel 50' Boom Steam Crane.
- ☐ Bucyrus-Erie 1030 —Gas ¾ yard shovel. Rebuilt.
- ☐ Bucyrus-Erie 41-B steam 1¼-yd. Shovel. Good condition. Very low price.
- ☐ Monighan Dragline 60-foot boom. Priced right.

Name.....

Address.....

P. & H. MODEL 206 Gasoline Combination Shovel and Clamshell machine. Good condition. Located vicinity Chicago. Box 336-SS.

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

THEW "O" ¾-cubic-yard gas shovel rebuilt 1931 and mounted on new center drive "cat". Box 343-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼ cu. yd. dipper, shipped May, 1926, good operating condition. Box 451SS.

CHEAP!

Two 20-B Bucyrus steam shovels. Located Aurora, Illinois. Price each $1500.

30-B Bucyrus steam shovel. Located Charleston, Mississippi. Price $1500. Box 303-SS.

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

BUCYRUS-ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

ONE TYPE "B" BUCYRUS-ERIE STEAM MACHINE, mounted on "cats", ¾-cubic-yard dipper, shop number 2301, 19-foot boom and 16-foot dipper handle. Box 83-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

USED P&H MODEL 700 gasoline, combination shovel-dragline, shop number 3007, including 1¼-cubic-yard drag scraper bucket. Dragline boom 40-foot plus 10-foot extension, shovel boom 25-foot 10-inches, dipper handle 19-foot 3-inches, dipper 1¼-cubic-yard. Engine Waukesha Type WL 4 cylinder 6¼"x7". Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

BUCYRUS-ERIE SLIGHTLY USED ½-CUBIC YARD Rope crowd gasoline shovel. Will demonstrate. Box 282-SS.

REBUILT GA-2 BUCYRUS-ERIE SHOVEL mounted on single shaft caterpillar, 1¼-cubic yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

BUCYRUS-ERIE 20-B steam shovel ¾-yard Dipper, $850. Chicago territory. Box 348-SS.

FOUR TYPE B BUCYRUS-FRIE STEAM SHOVELS. Good operating condition. $1000 each. Box 328-SS.

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS-ERIE-GAS-AIR-SHOVEL—22' 6" Boom—16' Dipper Handle—1 cu. yd. Dipper—Single Shaft Cat. Located near Albany, N. Y. Good operating condition. Box 455 SS

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

P&H MODEL 204. Shop number above 2200 combination Shovel Clamshell. 19' shovel boom, 14' 6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS.

BYERS BEARCAT, Model 27, gasoline ½-cubic-yard Skimmer scoop, crane-clamshell and drag shovel with front opening dipper. Engine—4-cylinder, 4"x5" Hercules Model OX. Machine new July 1928. Excellent condition. Box 293-SS.

TYPE B BUCYRUS-ERIE COMBINATION HIGH LIFT STEAM SHOVEL, 19-foot 8-inch boom, 16-foot dipper handle, ⅝-cubic yard dipper, power boom hoist and 36-foot boom clamshell equipment complete. Located central Indiana. Price as is, f.o.b. present location $2,000. Box 311-SS.

BROWNING STEAM LOCOMOTIVE CRANE, 20 ton capacity, 50 foot boom.

BUCYRUS-ERIE GAS + AIR CRANE with 40-foot boom, ¾-yard Page Dragline bucket. Fairleads and shovel boom, no dipper stick. Machine No. 4347.

Box 373-SS.

BUCYRUS-ERIE 1030, ¾-cubic-yard rope crowd gasoline shovel. Factory rebuilt and guaranteed. Box 283-SS.

TYPE B-2 BUCYRUS-ERIE STEAM SHOVEL, number 9830, mounted on single shaft caterpillar type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅝-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

BUCYRUS-ERIE GAS+AIR Combination high lift shovel and dragline equipment. Chain drive. "Cats." Very good condition. Located vicinity Chicago. Box 337-SS.

BUCYRUS-ERIE TYPE B High Lift Steam Shovel, Power Boom Hoist. Good condition. Box 425SS.

BUCYRUS-ERIE GA-2 High Lift Shovel—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, four cylinder 6¼"x8" Engine, Single Shaft Cat. Shop reconditioned. Bargain price. Box 426SS.

BUCYRUS-ERIE D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four cylinder 6½"x8½" Engine. Excellent condition. Box 428SS.

AMERICAN Gas Shovel—21' Boom, 15' Dipper Handle, 1 cubic yard Dipper, Waukesha four cylinder 6"x7" Engine. Bargain price. Box 429SS.

BAY CITY Chain Crowd Gas Shovel—15' Boom, 11' Dipper Handle, ⅝ cubic yard Dipper. Also 25' Boom Clamshell Equipment and ⅜ yard Clamshell Bucket. Excellent operating condition. Bargain price. Box 430SS.

BYERS BEARCAT Gas Shovel—16' Boom, 12' Dipper Handle, ⅝ yard Dipper, Hercules Gas Engine. Also 30' Boom Dragline Equipment. Good mechanical condition. Price right. Box 431SS.

P&H MODEL 208—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433SS.

P&H MODEL 600 Gas Shovel—20' Boom, 14'3" Dipper Handle, 1 cubic yard Dipper. Also 40' Boom Clamshell and Dragline Equipment available. 75 HP Waukesha Gas Engine. Bargain price. Box 434SS.

KOEHRING MODEL 1 Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435SS.

OSGOOD Steam Shovel—21'9" Boom, 16' Dipper Handle, 1½ cubic yard Dipper. Good operating condition. Box 436SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

BUCYRUS-ERIE MODEL 32-B Gas Chain Crowd Shovel—21' 6" Boom, 16' Dipper Handle, ⅞ yard Cast Front Inserted Tooth Dipper, Wisconsin six-cylinder 5"x6" Engine. Excellent condition. Box 422SS.

LORAIN 75-B Shop No. approximately 5000—21' Boom, 18' Dipper Handle, 1¼ cubic yard all cast Dipper, automatic Dipper Trip, Standard center drive Cat, Power Boom Hoist, four cylinder Waukesha 6¼"x8" Gas Engine. New July, 1930. Located Strawn, Texas. Excellent mechanical condition. Box 441SS.

HIGH LIFT TYPE B-2 steam shovel No. 3867 mounted on caterpillars and equipped with 19'9" boom, 16' dipper handle, ⅞ cu. yd. inserted tooth dipper, two speed, heavy counterweight, and boom hoist. Located in New York State (at or near Pine Bush). Would accept any reasonable offer. Box 448 SS.

TYPE GA-2 SHOVEL NO. 10937 mounted on single shaft caterpillar mounting and equipped with 24' boom, 16' dipper handle, 1¼ cu. yd. inserted tooth dipper, electric starter and boom hoist. Located in Massachusetts—now working. Can be purchased at very low price. Box 445 SS.

TYPE GA-2 SHOVEL NO. 9774 mounted on caterpillars and equipped with 24' boom, 18'4" dipper handle, 1 cu. yd. inserted tooth dipper, and air starter. Located in Massachusetts—now working. Can be purchased at very low price. Box 446 SS.

INDUSTRIAL BROWN-HOIST MODEL "H"—50' Boom, Steam 8 Wheel Locomotive Crane—50,000 lb. capacity. Good operating condition. Located vicinity Chicago. Box 442SS.

P&H MODEL 600—1-yard Gasoline Shovel. Three years old. Excellent condition throughout. Just been thoroughly overhauled. Will sacrifice at bargain to responsible buyer. Located in Wisconsin. Box 363-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21 foot boom, 15 foot dipper handle, 1¼ cu. yd. dipper. Good operating condition. Box 406-SS

Small Draglines
Under 2 Yards

BUCYRUS-ERIE D-2—Atlas Diesel—45' boom dragline and 1 cu. yd. Page bucket. Cat mounted. Good operating condition. Located near Lake Providence, Louisiana. Very attractive price. Box 450-SD.

BUCYRUS-ERIE D-2 DIESEL—40' Boom Dragline, used on light work about 6 months since rebuilding. Excellent condition. Located Central Ohio. Box 448 SD.

BUCYRUS-ERIE—REBUILT 45-B Gas—60' Boom Dragline. LeRoi six cylinder 6½"x7" Gasoline Engine. 1½ KW Kohler Light Plant installed. New Machine Guarantee. Box 456-SD.

MONIGHAN 60 FOOT BOOM DRAGLINE mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD

P & H Model 206 B Dragline. Good operating condition. Very favorably priced. Box 390-SD.

BUCYRUS-ERIE GAS+AIR combination high lift dragline and shovel. Chain drive. "Cats." Excellent condition. Located vicinity Chicago. Box 337-SD.

BUCYRUS-ERIE E-2 DIESEL DRAGLINE, caterpillar mounted, 50-foot boom, 1¼-cubic-yard Omaha bucket, Kohler lighting plant. Machine was new in July 1930 and has been used less than 6 months. Box 248-SD.

P&H MODEL 700 USED GASOLINE COMBINATION DRAGLINE SHOVEL, shop number 3007, 40-foot dragline boom plus 10-foot extension and 1¼-cubic yard drag scraper bucket. 25-foot 10-inch shovel boom, 19-foot 8-inch handle and 1¼-cubic-yard dipper. Waukesha Type WL 4 cylinder 6¼"x8" engine. Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SD.

30-B BUCYRUS-ERIE DIESEL DRAGLINE with 40-foot boom and 1-cubic-yard bucket located in Alabama. Box 91-SD.

P & H MODEL 700 DRAGLINE; number 2894 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700; number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

MONIGHAN BRAND NEW—40' Boom Dragline. Cat Mounted, Waukesha four-cylinder 6½"x7" Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 453 SD.

P&H MODEL 600 GAS DRAGLINE. 40 foot boom. 75 H.P. Waukesha gas engine. Also available clamshell equipment; shovel equipment with 20 foot boom, 14 foot 8 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SD.

BUCYRUS-ERIE 30-B Diesel—40' Boom Dragline Box 437SD

BYERS BEARCAT GAS DRAGLINE with 30 foot boom. Hercules gas engine. Also shovel equipment including 16 foot boom, 12 foot dipper handle and ⅝ yard dipper. All in good mechanical condition. Price right. Box 431SD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Clamshells and Cranes
Under 2 Yards

TYPE B CLAMSHELL MACHINE NO. 2609 mounted on caterpillars and equipped with 40' clamshell boom and necessary equipment for clamshell operation (but not including clamshell bucket). Located in Connecticut. Would accept any reasonable offer. Box 447-SCC.

GENERAL 35-FOOT BOOM CLAMSHELL MACHINE and ½-cubic-yard Lakewood bucket. Equipped with four cyinder Budda gasoline engine. Machine new September, 1929. Box 335-SCC.

THEW-UNIVERSAL 35 CRANE on center drive cats, 36' Boom, fairleads, ½ yd. dragline bucket, 3000 lb. hammer, leads and cap. Excellent condition, sale or rent. Located Western Ohio. Box 457 SCC.

P&H MODEL 600 GASOLINE CLAMSHELL MACHINE. 40 foot boom. 75 H. P. Waukesha gas engine. Also dragline equipment and shovel equipment including 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SCC.

BAY CITY CLAMSHELL MACHINE, 25 foot boom and ⅝ yard clamshell bucket. Excellent operating condition. Bargain price. Also chain crowd shovel equipment with 15 foot boom and 11 foot dipper handle—⅝ cubic yard dipper. Box 430SCC.

P. & H. MODEL 206 combination clamshell and shovel. Located near Chicago. Good condition. Box 336-SCC.

BUCKEYE CLAMSHELL-CRANE, gasoline driven, caterpillar mounted, equipped with 30-foot boom, ⅝-cubic-yard clamshell bucket, fairleads and backfiller scraper. Located in Milwaukee, Wisconsin. Box 371-SCC.

BUCYRUS-ERIE—SLIGHTLY USED LOAD-MASTER TRACTOR CRANE 14' BOOM— Rubber tired Wheels—Rated Lifting Capacity 4500 lbs. McCormick Deering Power Unit—New machine guarantee. Box 410-SCC.

BROWNHOIST CRANE — Gas — Cats. Model 2-C. Serial No. 8829. 1-yd. bucket. Good working condition. $1000.

McMYLER MODEL J. LOCOMOTIVE CRANE—35 Ton Steam. 50 and 75-ft. Boom. 1½ or 2-yd. buckets. New boiler and swinging engine recently installed. A real crane for long reach and heavy work. Thoroughly overhauled condition. $4,500.

Box 346-SCC.

If You Do Not Find What You Want Listed—Write Us

The Excavating Engineer
South Milwaukee, Wis.

Large Shovels and Draglines
2 Yards and Over

BUCYRUS-ERIE SHOP REBUILT 100-B STEAM SHOVEL; shop number 4890; 29-foot 6-in. boom, 20-foot handle; three-cubic-yard dipper. Can be inspected at So. Milwaukee, Wis. Priced to sell. Box 187-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator. Number 3402, 70-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Priced very reasonable. Located at Grand Prairie, Texas. Box 110-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable reel and approximately 1400 feet of cable, all in excellent condition. Reasonable price.
Address Box 268-LSD.

6-YD. SHOVEL

BUCYRUS-ERIE 320-B electric shovel, Ward-Leonard control, 3 phase, 60 cycle, 2300 volts, equipped with 6-cubic-yard dipper, 85-foot boom and 58-foot handles. Is in good condition and may be inspected in operation. Reasonably priced. Box 279-LSD.

What Do You Bid On a

70-C STEAM SHOVEL located near Marietta, South Carolina, where it completed a railroad job? Bargain as supplementary shovel or as supply of spare parts.

88-C STEAM SHOVEL located in Kansas. Carefully laid up after completing season's work. 3½-yard dipper. Fine condition. Any reasonable offer accepted.
Box 52-LSD.

FOR SALE

CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.

ALSO

2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap.
Box 419LSD

70-TON STEAM SHOVEL mounted on "cats," caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

50-B STEAM SHOVEL, new March 1927. Shop number about 4950. Has 26-foot boom, 17-foot dipper handle and 2-cubic-yard dipper. Priced to sell. Box 240-LSD.

225-B OWNERS

You may be interested in a partial Bucyrus-Erie 225-B steam shovel located in Kentucky coal fields as a source of spare parts. No reasonable offer refused. Box 211-LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas, where it is now working. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

DIESEL-ELECTRIC DRAGLINE

Class 14 Diesel electric dragline, Shop Number 5079, new fall of 1927 with 70-foot boom, 2-cubic-yard bucket, and with extra 10-foot extension, western location.
Box 296-LSD.

50-B BUCYRUS-ERIE ELECTRIC SHOVEL, equipped with 3-phase A. C. current, 550 volts, 60 cycle and has three motors. New Manganese steel dipper. Located South Carolina. Box 226-LSD.

85-C STEAM SHOVEL, on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Hazelton, Pa. Box 163-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator Number 3327 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Price very reasonable. Located at Turkey Creek, La. Box 111-LSD.

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment—in first-class condition. Located in northern Missouri. Box 452-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper. $2,000. Chicago territory.
Box 347-LSD.

175-B STEAM SHOVEL No. 4090, equipped with 75-foot boom, 48-foot dipper handle and 3½-cubic-yard dipper. Machine is in very good condition. Oversize boiler. Box 148-LSD.

3-YD. SHOVEL

BUCYRUS 78-C, caterpillar mounted; three-cubic-yard dipper; shop number 3611. Boom rebuilt last year. Equipped with new 103-C boiler and will pass boiler inspection in any state. Shovel is in very good condition and is in operation at present time.
Box 326-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

BUCYRUS 70-C, Shop number around 1500. Thoroughly overhauled. Good working condition. Eastern location. Box 299-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location.
Box 73-LSD.

BUCYRUS-MONIGHAN—MODEL 2-W—WALKING DRAGLINE EXCAVATOR 65' Boom and 2 cubic yard Bucket. 80 HP Type "Y" Style "VA" Fairbanks-Morse Diesel Engine. New January 1928. Present location near Joliet, Illinois. Can be demonstrated. Box No. 454LSD

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Miscellaneous Equipment

TWO BARBER-GREENE LOADING MACHINES. Priced extremely low for quick sale. Box 415-ME.

---

4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $200.00 each. Chicago territory. Box 349-ME.

For Sale or Rent

Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton, 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

LOCOMOTIVES

8 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine.

2 BALDWIN Locomotives, 19x26, standard gauge, 6 wheel switching type, shop numbers 39534 and 39536. Box 152-ME.

COMPLETE EQUIPMENT for 2 strip mines, contractors or quarry operations, No. 300 and No. 36 Marion steam shovels, well drills, locomotives, cars, crushers, picking tables, loading booms, cable and button retarders, compressors, motors, transformers, flood and search lights, camp equipment and new repair parts for above. Box 195-ME.

COMPLETE CONTRACTORS EQUIPMENT

Offered for sale by Southern contractors. Priced to sell.

7—Railroad Type Steam Shovels 2½ to 5 yd.
3—Full Revolving Shovels ¾ yd.
1—Gasoline Clamshell Crane ½yd.
2—Jordan Spreaders.
2—Locomotives, 26 Ton, American Saddle Tank.
32—12-yd. Western Heavy Duty Dump Cars
3—Camp Cars
1—Flat Car
2—1-bag Gasoline Concrete Mixers
Pumps, Boilers, Jacks and Other Tools

For further particulars, Address Box 138-ME.

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For inquiry on supplies and equipment not advertised another postal card addressed to us is provided. Check plainly *only* those items in which you are interested. *Excavating Engineer* will be pleased to serve you in forwarding your inquiry to manufacturers.

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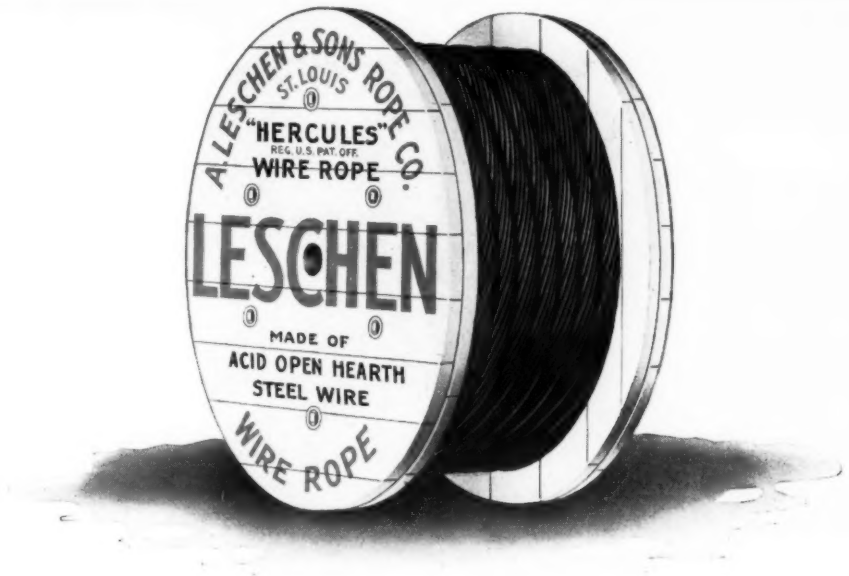

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It seems to be the opinion of some that the way to bring this about is to buy material that is low in first cost, but do you agree with them? After all, are not final results what actually count?

We do not claim that "HERCULES" (Red-Strand) Wire Rope is the lowest first cost rope that can be bought, but we are firm in our contention that it is the most economical heavy duty wire rope that can be used. It will not only do more work for each dollar of its cost, but on account of its longer life, less time will be spent in making replacements; moreover, it can be depended upon, even when extra hard conditions are encountered.

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